The Builder.

VOL. XLVI No. 2140 SATURDAY, FEBRUARY 9,

ILLUSTRATIONS.

Newcastle-upon-Tyne Police and Fire Brigade Stations; First Premiated Design.—Mr. Arthur B. Gibson, A chitect 196
Newcastle-upon-Tyne Police and Fire Brigade Stations: Second Premiated Design.—Mr. W. H. Seth-Smith, Architect 198
House for the Rev. Dr. A. Riddell, R. C. Bishop of Northampton (Plans, 205).—Mr. S. J. Nicholl, Architect 200
The Easter Sepulchre in Heckington Church, Lincolnshire 202
Sefton Mews, Prince's Park, Liverpool (Plans, 207).—Mr. John E. Reeve, Architect 209

CONTENTS.

The Pyramids of Gizeh 185
The French Industrial Crisis and the Building Trades 186
The Assyrian Department of the British Museum 187
Notes 188
John Henry Parker: In Memoriam 189
Portland Cement 189
Mr. Ruskin in the Clouds 190
On "Colour Decoration" 191
Artisans' and Labourers' Dwellings: the Buildings of the Peabody Trust 192
Lycian Rock Tombs 194
Police and Fire Brigade Stations, Newcastle-upon-Tyne 194
The Easter Sepulchre in Heckington Church 194
The Bishop's House, Northampton 211
New Stables, Sefton Park, Liverpool 211
Royal Institute of British Architects 211
The Sanitation and Reconstruction of Central London 212
Architectural Association 213
The Institution of Civil Engineers 214
Society of Engineers 214
The National Association of Master Builders 215
The Hospitals Association 215
The Surveyors' Institution: Preliminary Examination, 1884 215
Glass Floors in France 215
"What are the New War Offices to be built of?" 213
Assyrian Arches 216
The Defence of Buildings from Lightning Strokes 216
International Health Exhibition, 1884 217
Carpenters' Exhibition 217
Technical Education 217
Ventilation 217
Ensilage 217
Provincial News 217
Books: Scott's Farm Buildings (Crosby Lockwood) 218
Meetings 218
Miscellanea 218

*The Pyramids of Gizeh.**

THE Great Pyramid has been a fascination for mathematicians and archæologists: some mathematicians have seen in it a wonderful canon of proportion; other archæologists a chronological building for the determination of the historical epoch of the earth's history. The reason of its origin to ordinary minds is, of course, evident, and its approximate proportions easily attainable; but that is not sufficient for the supersubtle minds which see through millstones, or raise the baseless fabric of untenable hypotheses. Like the exact area of the circle, and the bisection of the circle or the law of parallel lines, the lovers of paradoxes find a recondite meaning in its chambers, passages, and proportions. The code of directions drawn up by Professor Piazzi Smyth has been carried out, although it is doubtful if the results are those anticipated by Mr. Smyth.

A portion of Mr. Petrie's work is devoted to the description of the instruments used in the operation of measurement; the reasons of this are given,—that the fittings have to be experimented on, and trials made before they are used, and that the observer has better chance of correcting errors by practically dealing with them. After all, the theodolite, the plumb-line, and the measuring-rod, and the extreme care to ensure reliable instruments, conduced no doubt to minute results. The only wonder is how the Egyptians produced such results, as no very fine tools have come down to the present day; the results obtained by the ancient Egyptians could not have been due to theodolites or theories, consequently it cannot be considered that this minute measurement throws any light upon the question.

The excavations of Mr. Petrie were carried on by shafts and casings found at the north-eastern and western sides; these casings were found all in good condition at the Great Pyramid. Similar operations were carried out at the Second and Third Pyramids, some new points were here discovered, and in the rubbish some pottery of the age of Cheops, of the fourth dynasty. A minute examination was made of the lengths and heights of the chamber, and especial attention given to the so-called coffer or sarcophagus, which has been supposed to be a kind of inspired standard measure of capacity by former inquirers; but, considering its mutilated condition, it is only a standard of capacity of those intellects that hold so untenable a proposition. The length of the cubit used in the King's Chamber of the Great Pyramid gives a mean of 20·632 ± ·004 in. The masons' marks give 3 cubits for 65 in. or 21·666 in., rather more than the average drawn from the King's Chamber,—a proof, if any were wanted, that the Egyptians did not use the unerring accuracy that has been supposed in their constructions. At the second period, beyond the wall of the peribolos, are the large barracks of the workmen discovered by Mr. Petrie. They are of pieces of limestone, buried in mud, with the floors of the galleries of mud. These barracks would hold about 4,000 men. In the *débris* here were found fragments of statues in diorite and alabaster, and scraps of pottery of a contemporaneous period. In the interior of this pyramid the chief interest was the coffer, better made than that of the Great Pyramid, and the ingenious mode by which the lid was secured by an undercut groove and pins. It appears that a good deal of crystallised salt exists in the interior,—all that remains of the mummy, whatever that may have been, placed inside it. The adjustment of the granite portcullis also exhibits great dexterity in moving heavy weights in a confined space.

The Third Pyramid, it appears, had no platform, but at a later age of the Roman period a considerable village grouped around it. This pyramid is admitted to have been enlarged after the first plan had been laid down, an important fact in considering the mode of construction. The smaller pyramids of Gizeh are not considered of great interest, no hypothesis about the object of their construction being connected with them except the historic doubts and confusion caused by the divergent opinions as to the founder of the third, started by classical authorities. The wooden coffin found in it resembles in style of art the monuments of the twenty-sixth dynasty, or B.C. 600.

The question of the orientation of the pyramids has also been touched upon to prove that it coincides with the change in the earth's axis, as shown by recent observation. The actual difference is 4′ west of north, at the rate of 1′ per 1,000 years: this would give about 4,000 to 5,000 B.C. for their date. The orientation must, however, have anciently been made by the Pole-star, which inquirers have supposed to have been seen from the passage of the Great Pyramid, and the Pole-star has shifted, owing to the precession of the equinoxes. But the Egyptians at this period have not left any record of the Pole-star, and the texts of the pyramids of the sixth dynasty mention Sirius and Orion, but not the Pole-star. Still the accurate way in which their sides face the due north shows a long previous experience derived from observations, and is most remarkable, considering the early appearance of solar myths. The west or east would have naturally appeared more suitable for the openings of the tombs. On the pyramidia which capped the later tombs of the Theban necropolis the sides which faced are indicated by the presence of Ra and Tum, the rising and the setting sun.

Passing from the question of the orientation, Mr. Petrie gives a description of the granite temple, the only existing one which remains of the age of the old kingdom. This he supposes to have been cased with limestone; it measures about 140 ft. in each direction, by 40 ft. high; the roof was supported by massive stone pillars, square and monolithic. All the doorways were provided with double folding-doors, with pivot holes cut in the granite. The open-air court atop was reached by a sloping passage of alabaster, cased with limestone. The temple had no inscriptions to attest its origin, but recent discoveries show that it was not built before the reign of Khafra, and it was connected by a causeway that led up to a similar temple, which stood before the Second Pyramid, in addition to which statues of Khafra were found in it. Besides the granite pyramid, traces of other buildings were found about the Great Pyramid.

The other pyramids were also examined by Mr. Petrie. At Abu Roash he found, amidst the broken-up fragments from a granite sarcophagus or coffer, the remains of a diorite statue, inscribed with the titles of a king called Men . . ra, probably one of the monarchs known as Menkara or Mencheres. The inscriptions of the pyramid of Pepi at Sakkharah, published in the Transactions of the Society of Biblical Archæology, it appears, were supplied by Mr. Petrie; the inscriptions were painted in bright green upon the white limestone. The diorite statues, fragments of which were found in the rubbish round the Great Pyramid, were also coloured white, but the alabaster ones had their draperies coloured green, and this colour appears to have been a favourite one at the time of the fourth and subsequent dynasties. The other pyramids have only been cursorily examined by Mr Petrie, whose researches do not materially add to the knowledge of their construction.

It appears that there has been no perceptible change in the climate in historic times; there exists one gargoyle at Memphis to catch any

* The Pyramids and Temples of Gizeh, by W. Flinders Petrie. 8vo. London: Field & Tuer. 1883.

chance rain that might fall, the accumulation of sand went on at all times. The pyramid of Abu Roash is the only granite-cased one besides the Third, and must have been built about the same dynasty. No collateral evidence has yet been found to show how early the granite quarries of Syene were worked before the fourth dynasty. The question of the identity of Khufu and Khnum Khufu has long been settled, the fact being that the names of this dynasty are all prenomens, and that while the other names, such as Khafra and Menkaura, had the name of the sun, Ra, in their composition, Cheops or Suphis selected Khnum, the name of the deity of Elephantine, with whom he had some relation. By analogy this name should be Khufu-Khnumu, with the inversion, and the meaning appears to be "He who is protected by Khnumis"; but it is difficult to determine in all cases the sense of prenomens, besides which the diadem title of both names is the same. The Third Pyramid was, no doubt, the work of Menkaura, of the fourth dynasty. That he was a son of Cheops is impossible, as the long reigns of Cheops and Chephren required for the construction of the Great and Second Pyramids, and their extreme old age, prevent the possibility of Mencheres being his son. The step pyramid at Dashour may be of the time of the eighth dynasty.

No additional light is thrown upon the age of the Sphinx to what is already known; as it has no inscription its age period depends upon archæological criteria, such as the appearance of the Sphinx in art, and the first instance of the head-dress *klaft*. It does not appear earlier than the twelfth dynasty.

Although Mr. Petrie is against what is called the "accretion" theory that pyramids grew with the length of the king's reign, the theory seems the most tenable hitherto advanced. Of course, subsequent monarchs may have finished the work of their predecessor after it had attained unfinished dimension, and even possibly have used it for their own interment; but there is a mystery about the burial-places of the early Apis. Belzoni found the bones of a bull or a cow in the Second Pyramid.

The chapter on the mechanical means by which the Egyptians carved hard stone is most interesting; and although it may be doubted if the Egyptians knew diamonds, it is evident that they used some of the harder stones. It is unnecessary to say that no tools of the kind have been found or depicted, and that granite is supposed to have been stunned by bronze chisels and mallets, and then faced by conical mullers or polishers. Mr. Petrie has, however, found traces of bronze saws and tubular drills, and the cores of stone in some instances remaining. He also thinks that there is strong evidence of circular saws and lathes, but the question depends on the traces left of the work, and in some instances these are unequivocal. Leaving aside the diamonds, Mr. Petrie has solved some of the difficulties about the mechanical resources employed by the ancient Egyptians, no traces of steel having been found. The theory of the object of the pyramids is temperately and fairly investigated by Mr. Petrie, but the one adopted by Egyptologists is that they were tombs, and it is confirmed alike by inscriptions, coffers, and bodies. That they were "inspired" works is not in the domain of science, but of "theology," and unsound; it has arisen from the restricted chronology considered to be necessary for such theologies as can believe in nothing historic older than B.C. 4,000, and which makes it a matter of faith that the pyramids were built about B.C. 2,000.

Mr. Petrie enters into the question of the organisation necessary for the building of the pyramids; he supposes, following Herodotus, 100,000 of the *corvée*, 4,000 of whom he considers to have been skilled masons, who would prepare 120,000 average blocks. These were trimmed and then moved by rocking with crowbars, but Perring is said to have found plug-holes in the masonry, by which the blocks were raised from tier to tier, so that the steps formed the scaffold for its construction.

The pyramids have excited so much attention at all periods that the interest in them remains undiminished. Mr. Petrie's measurement will, probably, remain as the canon of their measurement, as the care in the details is unrivalled. It may be doubted if the extreme minutiæ of measurements were in the minds of the Egyptians, and if they did not work by the rule of thumb, but the work of Mr. Petrie, is one of mathematical precision and of science. The history and archæology of the period have been long investigated, and there is little to add till accident reveals some contemporaneous monuments throwing light upon the subject. The principal facts eliminated are the numerous population required for the manual work, the high accuracy in details possessed by the workmen, and the plans of the builders and architects, and the political organisation of so remote a period.

THE FRENCH INDUSTRIAL CRISIS AND THE BUILDING TRADES.

The industrial crisis in Paris has become the subject of a prolonged debate in the National Assembly, and the facts adduced, and the problems involved, have more than local interest. Many trades are affected, but the crisis is doubly serious where it touches the building trades; first, because of the extensive interests involved, and, secondly, on account of the dangerous political action of the workmen thrown out of employment. Anything like authentic figures it is always difficult to obtain, especially in so complex a community as that of a large metropolis. M. Jules Ferry estimates the number of men employed by the building trades of Paris at only 120,000, and therefore attributes the crisis not so much to the excessive number of workmen, as to exaggerated speculation in building. M. André Cochut, in the *Revue des Deux Mondes*, states that building material to the value of about 60,000,000*l.* has been brought into Paris within the last few years. Adding to this the cost of land, which has doubled, and the increase in the rate of wages paid, he considers that from 200,000,000*l.* to 250,000,000*l.* have been spent for building purposes within the last five or six years. But this production was not only excessive,—it was, to use M. Ferry's words, "badly planned and badly executed." There is a plethora of high-class residences, while the construction of artisans' dwellings has been entirely neglected M. Th. Villard, in a report drawn up for the Municipal Council, calculates that, while the population of Paris has increased during the last seven years at the rate of 15 per cent., that of furnished and low-class lodging-houses has augmented at the rate of 80 per cent., though the number of these workmen's dwellings rose only to the extent of 20 per cent. Thus great over-crowding has ensued, and the price for the accommodation that does exist is exorbitantly high.

The actual falling-off in the building trades may be judged by a few municipal statistics. For instance, the taxes paid in 1882 for the creation and maintenance of roads in front of new houses amounted to 1,319,000 francs, while in 1883 this tax only yielded 654,000 francs. Again, the number of permissions granted by the Prefecture of Police for the building of stories to houses in course of construction has fallen from 120 or 150 per week to sixty or seventy per week. Nevertheless, M. Ferry is of opinion that the crisis in the building trade is not so acute as it might be; and, for all consolation, prophesies that matters will be very much worse in 1885. According to the accounts given by the Crédit Foncier, there still remains building work on hand estimated at 4,000,000*l.*, while the carpenters' and joiners' work for something like 6,000 stories or flats built during the course of last year has yet to be done. It is when all these enterprises already commenced are completed that the crisis will become most acute. To meet this gloomy outlook the French Premier can only suggest the active prosecution of public works. In this respect, at least, there will be no falling-off. If necessary, supplementary credits will be demanded to push forward the the reconstruction of the Sorbonne and École de Médecine. In the estimates for the Budget for 1884 public buildings in Paris are put down at 465,440*l.*, and the town has increased, rather than reduced, its expenditure in this respect. Thus on the maintenance and construction of streets, roads, &c., 2,800,000*l.* were spent in 1883, while 2,960,000*l.* are set down for the same service during the current year, and the number of labourers, &c., employed for this work will be increased from about 20,000 to 24,000. If the projected metropolitan railway was built or artisans' dwellings erected, or if the schemes for enlarging the Pont d'Austerlitz, the Rue des Filles-Dieu, the approaches of the Corn Market and the Palais Royale, were carried out, something like 8,000,000*l.* would be devoted to building purposes, and such undertakings would prevent the still greater crisis that otherwise must ensue in 1885.

Such, in a few words, is the official version of the economical crisis, so far as the building trade is concerned; and this view,—these suggestions for the future,—will doubtless be accepted by the majority among capitalists and middle classes. Nevertheless, and to do full justice to the question, we should also inquire what those who are the first to suffer have to say on the subject. The workmen themselves have not failed in this crisis to make their voices heard, and to formulate a programme of action by which they believe present evils might be remedied, and their recurrence avoided. Several Parisian trade unions have associated themselves together for the purpose of investigating the matter, and have presented a report to Parliament which we hope and believe is far from exact, at least, in its statistics. The tendency to exaggerate permeates all classes in France; but those who are the least educated naturally accentuate this national failing. The trade unionists, however, in their organ, *Le Proletaire*, state that house-carpenters and joiners employed in the building trade of Paris number, in prosperous seasons, almost 30,000. Of these, 8,000 are believed to have left the capital in despair; 15,000 are out of work, and among those who are employed half the workmen are foreigners. This decline in the trade is attributed, in a measure, to the importation of foreign woodwork. A window-frame can now be obtained all ready-made from Norway, and it does not cost more than the charge made in Paris for the mere work of hand. The number of stone-cutters in prosperous times is also estimated at 30,000, but there are now only 15,000 remaining, and of these barely a third are able to find employment. Among the masons, only 15,000 out of about 40,000 contrive to work. The difficulty with respect to these figures arises from the fact that they in no wise agree with the estimate given by the Premier. M. Jules Ferry, we have seen, considers that the building trades employ only 120,000 men; while the trade unionists declare that only one in four are at work, and reckon the number of men unemployed at 150,000.

In spite of this contradiction in the estimate of the amount of suffering, there can be no doubt but that the crisis is sufficiently serious to compromise the prosperity,—even the safety,—of the city. The Government, however, does not propose any remedy beyond the general encouragement of public works. With the workmen, on the contrary, the wildest schemes are freely discussed, and there is a dangerous tendency to believe in the power of legislation to cure economic evils. Nearly all French workmen, who are not indifferent to such matters, are socialists; but there is a great variety of forms of socialism, and the term does not generally involve revolutionary ideas. The largest section, on the contrary, of organised working-men have at last come to the conclusion that their ideal can only be attained by the slow process of evolution. There remains, however, a small minority of turbulent agitators who still rely on violence, and think it possible to establish socialism on the morrow of a sanguinary revolution. Among these the house-carpenters and joiners have played a prominent part. It was from their corporation that the anarchist delegate Tortellier was sent to the International Trades Conference recently held in Paris. These

anarchists, aided by some revolutionary collectivists, succeeded at recent meetings in passing resolutions repudiating all attempts at reform and legislation, and calling upon the people to prepare for an immediate and armed revolution. If anything was wanted to accentuate the present commercial depression, such meetings are well calculated to achieve this purpose. Fortunately, all who are acquainted with French working-class movements know that the Anarchists and Impossibilists are an infinite minority. Nevertheless, they sometimes carry with them workmen and others who have no experience in political organisation and action, and who, as in the present crisis, when so many artisans are suddenly thrown out of employ, attend public meetings for the first time. The real strength of French labour organisation will be found with the members of the Fédération des Travailleurs Socialistes de France. This is the party which organised the International Trades Conference; and its partisans are known as the Possibilists on account of their comparatively moderate and practical doctrines. They urge that such a crisis as the present would be avoided by more energetic action on the part of the State, and the development of greater strength among the trade unions. The State or the Municipality should, they insist, build workmen's dwellings, and open stores for the sale of meat, bread, and articles of primary necessity. This would establish a wholesome competition with private enterprise and speculation; for the State would sell at cost price. All public works, they claim, should be given to trade corporations and not to private contractors or speculators. But these corporations are too weak, in many instances, to carry out such enterprises, and hence the proposal of a subsidy of 1,000,000*l.*, to, as it were, endow the trade unionism of Paris. To Englishmen, and even to many English trade unionists, this suggestion will seem preposterous. But workmen in England have for long enjoyed absolute liberty and freedom of association. In France, the Bill which is to render trade unionism legal has not yet been definitely adopted by the Legislature. On the other hand, the French Government did on one occasion give a much larger sum to relieve small tradesmen during the exceptional depression of the year 1848. What was done for small shopkeepers might also be done for artisans. A gift of money by the State to the French trade unions might be considered in the light of a compensation for the unfair position in which they have been placed by the denial of the right of association.

Another important phase of the question has also been brought forward. The present depression is in part due to the great number of foreign workmen who have thronged to Paris, and undersell native labour. M. Jules Ferry treats this grievance with a light heart. If foreigners come in such large numbers it is because France is, after all, a happy and favoured country. So fortunate are the French, that they will no longer do the meaner class of work, and are, therefore, glad to call in the Italian and the Belgian. There is undoubtedly much truth in this. In the South of France all the navvies are Italians, and in the north this is also very frequently the case. But the grievance does not end here. In all trades, even those where the greatest skill is required, and notably in every branch of the building trades, foreigners, especially Belgians and Germans, undersell the French artisans. Actually at the new central post-office, now in course of construction, out of forty painters and house-decorators, only five are genuine Frenchmen. Under these circumstances the Socialists argue that a law should render it illegal to employ foreign workmen to undersell native labour, and that foreigners should be paid according to the custom of the trade, or according to established tariffs, but in no case less than what was given to Frenchmen for the same class of work.

Such is the general character of the ideas and proposals which the present depression has helped to bring forward; and as the building trades are largely involved, both in the industrial depression and in the socialistic agitation resulting therefrom, the crisis deserves special notice at our hands. Before the present agitation ceases many interesting and technical subjects will be discussed, and perhaps some practical experiments attempted. The question of the housing of the poor is involved, together with the possibility of State intervention in such matters. The practicability of co-operation among workmen in the carrying out of large building enterprises is also at issue, while the struggle between the rival doctrines of individualism and of State socialism meets us at every step. It must be acknowledged, therefore, that the difficulties now besetting the Parisians have raised problems of no ordinary interest and difficulty.

THE ASSYRIAN DEPARTMENT OF THE BRITISH MUSEUM.

THE prolific nature of the harvest of antiquities which has resulted from the explorations of Mr. Rassam in Assyria and Babylonia has necessitated a considerable expansion of the Assyrian department in the British Museum, and also a complete re-arrangement of the antiquities exhibited. The removal of the natural history collections to South Kensington placed the fine suite of rooms on the north side of the British Museum at the disposal of the Keeper of the Department of Oriental Antiquities, and Dr. Birch, aided by his two assistants, Mr. T. G. Pinches and Mr. Ernest Budge, have now succeeded in producing order out of the hitherto chaotic confusion of Assyrian, Egyptian, and Phœnician antiquities in this section of the Museum. The galleries, which have now undergone the long-necessary re-arrangement, and are now open to the public, are the Koyunjik Room on the ground floor, in which are exhibited the sculptures and inscribed tablets obtained by Sir Henry Layard in 1849-50, Mr. Rassam during his several exploring campaigns, and Mr. George Smith in 1873-4; as well as a new Assyrian Room upstairs, in which a special selected series of typical examples of the Assyrian treasures of the British Museum is placed on view. By the adoption of a definite system in the work of re-arrangement the authorities have conferred a great benefit upon all students of Oriental art and antiquity,—as well as the casual visitor to these galleries, in that for the first time since their arrival in this country the Assyrian antiquities adapt themselves to a consecutive and systematic study. The works of Mr. Fergusson in England, and MM. George Perrot and Chipiez in France, have done much to prove the importance of the study of the art of Assyria and Babylonia to those who would understand the origin of Western art, while each day the labours of the small band of Assyriologists are bringing out more and more evidence showing the importance of Assyriology to the student of philology, mythology, and the history of civilisation. The claims of Assyrian remains being thus asserted it is all the more important that the material upon which they are based should be so arranged as to admit of both consecutive and departmental study. To aid the student in the study of the collection from Nineveh exhibited at the Koyunjik Room, Dr. Birch, with the assistance of Mr. Pinches, has prepared a small descriptive handbook.* The work is based on the model of that prepared by Dr. Birch for the Egyptian collections, and is a great improvement upon the former meagre account of this section embodied in the General Guide to the British Museum, a wondrous encyclopedic production. The historical introduction to this guide-book, from the pen of Mr. Pinches, is certainly the most concise *résumé* of the history of the dual empires of Mesopotamia that has yet appeared, and indicates in a striking manner the great accession to our knowledge of the remote past, resulting from the discoveries of the last five years. The columns of the *Builder* do not admit of a review of this important section, but it may be admissible to say that the theory as to the situation of the land of Cush which Mr. Pinches puts forward (p. 3) is one which will receive but few adherents among his brother Assyriologists, nor will it be accepted by students of Oriental and Biblical history, while the account of the Pantheon and religion is certainly not up to the standard of recent researches; and the symbols of the gods,—a most important branch of art,—are quite neglected. The description of the sculptured slabs arranged on the walls of this gallery coming from the south-west palace at Koyunjik, the greater portion of which was built by Sennacherib (B.C. 704), is from the pen of the Keeper of the department. A description of these various tableaux is no doubt a great gain to the visitor, who is unable to understand the various incidents depicted there, but we doubt if the long and prosy enumeration of petty details of dress, accoutrements, and natural features here given will not prove too much for the patience of the most studious visitor. We have in the *Builder* more than once pointed out the true position occupied by these sculptured or graven tableaux, as forming a series of folio plates illustrative of the narratives inscribed upon the obelisks, cylinders, and tablets. In these latter we have the descriptions from which the artist compiled his picture, and it is by these that they should be interpreted to the student of modern times, as they were in times past to the subjects of the great king. The value of such aids to the understanding of the artist's work cannot be too highly estimated, and consequently they should be utilised more than they are in the present edition of the guide-book. This may be exemplified in the case of the first series of slabs (Nos. 3, 26) here exhibited, which represent the wars against Merodach-baladan. Full details of these wars are found in the Taylor and Bellino cylinders, supplemented by numerous reports and despatches. Extracts from these, supplemented by such local details as might have been gathered from the works of Layard and Loftus regarding the marsh-land of Gambulu, the modern El Afadj, in which the fugitive prince is represented as hiding, would have done much to show the great historical value of these tableaux and the inscriptions which illustrate them. The same applies to the explanation of the slabs (Nos. 34, 40, 44, 50) illustrating the Elamite wars of Assurbanipal, a full description of which is found in the cylinders found by Mr. Rassam and the report and epigraph tablets. The series of sculptures exhibited (Nos. 51, 56) which represent the building of the palace of Sennacherib at Nineveh, will always be of great value, as showing the mode in which these great edifices were constructed, and the various kinds of manual labour and mechanical aids employed by the Assyrians in their public works. These we see depicted here in a most vivid manner, and a description of the work, an epitomised specification of the work, is found in the above-mentioned cylinders, and on the Nebby Yunus tablet at Constantinople. In Assyria, as in Egypt, the *corvée* was the chief source of manual labour. The *corvée* employed in the construction of this palace, we are told by the king in his inscriptions, was composed of bands of men selected from the various colonies of Aramean, Phœnician, Jewish, and Babylonian captives, and even Cyprioti-Greeks (*Yatnanai*). In these sculptures we see vividly all the worst features of forced labour, such as we are familiar with at the present time in Egypt; and such as have always accompanied the exercise of this power by the rulers of the East. Such scenes as we have here may be compared with their Egyptian parallels in the tombs of Ti and Rashopses at Sakkarah, or the beautiful tomb of Thothotpou recently removed to Boulak, where the *Ka* (edilon) statue of the deceased is being dragged to its resting-place in the *mastaba*. The gangs of diggers are busy on the mound, while long lines of basket-carriers ascend and descend the mound with earth and rubble to build the mound, the work being superintended by "the master-builder" and a guard of soldiers. The removal of the great winged bull shows that the Assyrians, like the Egyptians, knew the value of the

* Guide to the Koyunjik Gallery. Printed by order of the Trustees. 1883.

inclined plane and the lever; while on one of the towers adjoining the river a man is hauling up a bucket of water by means of a pulley. We thus see that three of the mechanical powers were known to the builders of Assur. The inscription over the king's chariot, on the last slab of this series (No. 56) reads:—"Sennacherib, King of Multitudes, King of Assyria, had the bulls and colossi, divinities which had been made in the land of Baladaa for the palace of his lordship, which is within Nineveh, set up with joy." The land of Baladā was situated in the Zagros Mountains, and was the chief source of the white marble and gypsum used by the Assyrian sculptors and architects. It is evident that the sculptures were merely roughed out in the quarry and finished when *in sitū*. The bull here has no feathers or beard, and the great bulls flanking the chief gate of Nineveh uncovered by Sir Henry Layard were found to be unfinished. In the centre of the gallery are a series of six table cases containing smaller objects of interest. The first case (A) contains the finest specimens selected from the large collection of engraved cylinder and other shaped seals. These objects are of the highest importance to the student of Babylonian and Assyrian art. As in Greek and Roman art we find the chief sources of mythological and symbolic art on the coins and engraved gems, so are these early samples of the lapidary's art the chief sources for the illustration of the legends of Assyria and Babylon. Here we have the artistic representations of the labours of Isdhubar or Nimrod; his struggle with the lion (Nos. 8 and 32), as Hercules slew the Nemean lion, or the great bull of Heaven (Nos. 13, 49), the counterpart of the Cretan Minotaur. The Chaldæan Noah, *Shamas napisti*, "the Sun of Life," in his ark (No. 49), the scorpion men who guarded the Sun (No. 38), and the deeds of Heabani, the satyr-like companion of Isdhubar, which form incidents in the Epic of Isdhubar, are all illustrated in those gems. Other seals contain representations of the worship of the Sacred Tree, of Fire, and the Sun and Moon, and one of the most interesting from a historical point of view, is the signet of Darius Hystaspes, with its trilingual inscription in Persian, Median, and Babylonian (No. 3). The stones most used in early times were green jasper, crystal, amethyst, ironstone or hæmatite, grey and blue chalcedony, and carnelian. As the series of seals here exhibited extends over a lengthy period from the earliest to the latest days of the empire, so the work varies. The early work is little more than deep-cut drawing, the joints being indicated by round holes, while in some of the later examples (Nos. 32, 26, 13) great skill has been attained in the representation of the muscles, hair, and features. The Babylonians, like the Egyptians, as shown by Mr. Flinders Petrie, in his work upon the Pyramids of Gizeh, used the diamond-drill for their lapidary work. The next two cases (B and C) contain fine specimens of the terra-cotta books of Assyria, the Creation and Deluge tablets, and a series of grammatical tablets. In case D are a number of the historical tablets, cylinders, &c., from which the description of the sculptured slabs may be compiled. On one side of this case are a selection of the commercial and legal tablets, sales of houses and land (Nos. 30, 44, 48), of slaves and merchandise. The contracting parties to some of these transactions being Jews and Syrians, the tablets have written upon them endorsements in Phœnician or Aramean (Nos. 29, 43, 45). Two cases at the end of the room (E, F) are devoted to bronze implements. The arrangement of this room is a great improvement upon the former one, and enables the visitor to gain some idea of the various classes of objects composing the Assyrian collections. It would add greatly to the value of the guide-book if a plan of the room were added to the few autotype plates which illustrate the work. The new Assyrian room, which contains a fine series of objects illustrative of the art and architecture of the dual empire, will be described in a subsequent notice.

NOTES.

An amusing and highly typical letter by "Ouida" appeared in the *Times* a few days ago, written in reply to a request that she would join in opposing an extension of the Skipton and North-Eastern Junction Railway over Aysgarth Force. "Ouida" thinks that railways are projected by "contractors," and to her excited imagination earth is full of contractors going up and down seeking for beautiful spots through which to run a railway, for pure wantonness. Then the railway is to cross Aysgarth Force "on skew arches," and it has been settled by "Ouida" and her compeers that there is something in a skew arch peculiarly hurtful to the higher instincts of humanity. But the best of the letter is the utter want of perception of the supply and demand aspect of the matter. "Ouida" thinks it wrong that railways should be made through beautiful spots merely because they pay; she forgets that they will only pay because people in the district want them. She undertakes to assure the world that the farmers there cannot want a railway. Does "Ouida" seriously suppose that directors (not "contractors," Ouida) expend money in a new railway project without ascertaining first whether they will get a return for it? And whence does she suppose they look for the return? Let "Ouida" and her anti-railway allies go round among the inhabitants of the threatened district, and get them all to sign a paper saying that they do not feel the want of a railway, and will not purchase a single ticket on it if it is made, and they may rest secure that the railway company will trouble them no more. As to the wholesale sneer at a system of locomotion which has done more to advance civilisation, and has called forth more healthy human energy and ability, than anything else in modern times, such feelings are only the product of ignorance and narrow-mindedness. The work of railway engineers has had, to say the least, a more wholesome influence on society than the tawdry sensational literature to which "Ouida" herself has so largely contributed.

Under the title "The Possibilities of a Revived Industry," *Harper's Magazine* for this month contains some remarks on the prospects of the use of terra-cotta in American architectural design, and two or three illustrations of what has been already done. An engraving of one of the windows of the Art-Museum at Boston shows what a direct influence South Kensington has exercised there. The style is more Gothic, the arches being pointed, but otherwise the first impression is that it is a bit from one of the inner cortiles of the Kensington Museum. The only building in the States which has been carried out entirely in terra-cotta, as far as external design is concerned, is the building for the Long Island Historical Society at Brooklyn, which is referred to as recently erected. The architect's name is not given. Among the novelties of American spelling we notice "bass-relief" instead of "bas-relief," a very awkward and illogical innovation.

Messrs. Goupil & Co. have on view at present Lefebvre's life-size figure, entitled "Psyche," which was in last year's *Salon*, and is a good example of the school of which he has been the most eminent exponent, and which aims at combining the study of the nude with the expression of poetic feeling in the figure. Psyche sits on a rock looking over a dreary leaden sea, a casket in her hand, a star on her forehead, a mass of hair falling down over her shoulders; the face has a very pathetic and spiritual expression. There is something not quite satisfactory in the modelling of the feet and of the legs, which seem too long from knee to ankle, and the figure generally is not powerful as a figure in regard to drawing. It is very fine in colour, and there is an imaginative character about the whole conception which renders it a very interesting work.

We may return to the subject of Sir J. Bazalgette's presidential address the other day at the Institution of Civil Engineers (see p. 53, *ante*), to comment on the remarkable appendix which is annexed to the printed abstract of the paper. This includes forty pages of sanitary statistics, collected from the five quarters of the world. Some of the details are of startling novelty. Thus it will be new to most of our readers that Genoa has two and a half times, and Turin six and a half times, as many inhabitants per house as are to be found in Pekin. Yet the death-rate of Pekin is twice that of Turin. With the exception of Christiana, which has a death-rate of 20·4 per 1,000, and a density of 23·5 persons per house, London is the healthiest city out of forty-five which are tabulated. The death-rate is 20·4, and the number of persons per house 8. Turin has 65·5 persons per house, and a death-rate of 25·1. There is no very apparent connexion between death-rate and numbers, either per house or of the entire city. Delhi, with 5·6 persons per house, has a death-rate of 47·86 per 1,000, among its 173,393 inhabitants; while Rome, with 27 persons per house, has only a rate of 26·1, among 304,458 souls, and Paris, with 29 persons per house, has the nearly equal death-rate of 26·3 among its 2,240,000 inhabitants.

The Institute of Architects have recommended the presentation of the Royal Gold Medal this year to Mr. Butterfield. In choosing for this honour an English architect who is not a member of their own body, they have acted in a liberal-minded and dignified spirit, and we hope one effect of this may be to induce some of the architects who stand high in the profession, but are not in the ranks of the Institute, to reconsider their ways and join hands, and, instead of standing aloof and idly complaining that the Institute is not truly representative of the professional ability and artistic culture of the day, to endeavour themselves to assist in rendering it more so, which would certainly be the more chivalrous as well as the more practical course to pursue.

The passing of the Metropolis Water Bill by the Examiner for Standing Orders is calculated to increase the perplexity with which that tribunal is regarded by all who are interested in promoting, or in opposing, new public works. The object of the Standing Orders of Parliament we take to be mainly twofold, viz., to prevent any vexatious trifling with the public in the way of inviting subscriptions, and to prevent any surprise to the owners of property, by giving them ample notice of what is proposed to affect them. To this end Clause 3 provides for notices of application to amend or repeal any former Act; Clause 17 is yet more explicit to the same effect; and Clause 36 provides for the delivery of an estimate of the expense of the undertaking to be lodged by the 31st of December. The Metropolis Water Bill of this year by Clause 4 proposes to amend or repeal all the Acts of the Water Companies by which their rates are now regulated; and by Clause 18 it seeks to appropriate to dividend the chartered real property of the New River Company. Yet the Examiner is reported to have found that this was not an alteration of any statutory provision for the benefit of the Companies requiring notice under the Standing Orders!

From the *Gazette des Architectes* we learn of the creation in Paris of a "Société des Amis des Arts Parisiens," having much the same objects as our "Society for the Preservation of Ancient Buildings," though to be conducted, we trust, with less zeal (in one sense) and more knowledge. The Society includes painters, architects, politicians,—whoever are interested in the preservation of the monuments of Old Paris, though, in the list of members of the committee of organisation (not yet filled up) the architects greatly predominate. The association proposes, however, to include other arts besides architecture under its care, and is thus distinguished from the "Commission des Monuments Historiques," the objects, or, at the least, the operation, of which would, probably, be considered by our

English Society as of a hostile and nefarious character; but, as no such insinuation is made against them, we may presume that the new French association is swayed by more rational and less prejudiced counsels than those of the cognate English Society. The secretary of the Paris Society is M. Normand, to whom inquiries may be addressed at the Cercle Historique, which has been placed at the disposal of the Committee as their head-quarters for the present.

The drawings sent in competition for the Pugin Travelling Studentship were exhibited at the last meeting of the Institute, and were to be seen during subsequent part of this week, in the Arbitration room on the ground-floor at Conduit-street. There were seven competitors: Messrs. Sankey, A. B. Pite, Strong, Edwards, Simon, Kemp, and Sirr; the first-named gentleman being the successful competitor. The drawings sent by Mr. Sankey and Mr. Pite are unquestionably the best sets of the series; the general average of the other work is fairly good. For reasons which we need not specify, but which some of our readers will understand, we prefer to decline giving any detailed criticism of the sketches, or any direct opinion as to the decision of the Council; merely observing, to prevent misunderstanding, that our reticence is not to be construed as implying any kind of censure on the award.

The Lower Thames Valley drainage scheme appears to be exciting an opposition which we imagine to be more according to zeal than according to knowledge. At the Meeting of Inquiry held at Kingston on the 6th inst., there were counsel representing various private landowners, the East Moulsey Local Board, the Thames Conservators, the Commons Preservation Society (what their *locus standi* was we cannot make out), and forty-seven rowing-clubs, all in opposition to the scheme, as calculated to spoil the Thames for recreation purposes. The matter is, no doubt, a serious one and demands careful consideration on every side, but it is certain that something must be done with the drainage of the Lower Thames Valley district. No alternative plan seems to be proposed, and we are inclined to believe that the alarm raised is, at least, much greater than is at all called for. "Effluent" has become a disagreeable sounding word with disagreeable associations; but, as a matter of fact, the chemical and mechanical purification of sewage has been carried so far now that we doubt whether those who are so much alarmed on the subject would really know when the effluent was turned into the Thames if they were not told. They had better get fuller information, and consider the subject more calmly, remembering that "effluent" is, at all events, a far less deleterious addition to the river than gross sewage, the influx of which is at present being winked at by the law, simply because there is no doing anything else with it.

On dit that the Wellington statue is to go by safe and easy roads to Aldershot, and be set up on a site overlooking the North Camp. This is perhaps the best destination that has been proposed for it. From its colossal size, the statue would be out of scale with any site surrounded by buildings on which it might be placed, while on an open space this difficulty will be got rid of. We have all along said that to melt down the statue, which, whatever its defects, was modelled from the living man and the living horse, would have been a mistake; and it is gratifying to hear of a site being found for it, which will be unexceptionable in regard to association, and about the best-circumstanced site in regard to effect.

We regret to have to note that the Parkes Museum of Hygiene is in danger of succumbing for want of funds to keep it in operation, unless the Council can obtain at an early date some more definite and liberal support towards the cost of carrying it on. Such a museum is so valuable, in these days of experimental sanitation, as a centre for the exhibition of methods and materials, and still more as a suitable and convenient place for the delivery of lectures on sanitary subjects, in which capacity it is needless for us to observe how well it has recently been made use of, that it will not be creditable to our day and generation if the Museum is allowed to be closed from no deficiency on the part of its managers, but merely for want of practical interest in it on the part of the public.

The Council of the Institute of Architects have sent a circular to the former winners of the Pugin Scholarship inviting them to compete in designing a medal to be presented to all Pugin students, past and future. The only suggestions are that an inscription, which should form part of the design, should, "in some fashion," clearly state the objects of the medal; that if a shield be adopted as part of the design, the Pugin motto, "*En avant*," must be introduced, and that the words "Pugin Travelling Studentship, founded 1864," must be on the obverse or reverse of the medal. The size is fixed at 2½ in. diameter. Surely a bas-relief portrait of Pugin would be a very suitable feature in such a design; the rather as Pugin's ardent, courageous, and chivalrous character falls in so fitly with that manner of commemoration. In that case, however, the judgment of a sculptor should be called in before making the award.

JOHN HENRY PARKER.

IN MEMORIAM.

One more familiar figure has quitted the stage, having played well his part in life's great drama. At Oxford, on the last day of last month, somewhat suddenly, but quite peacefully, full of years and of honours, died the subject of this brief memoir. The grave must not close over one who has done so much for art without a sympathetic tribute from our pen. As an antiquary and archæologist working in a somewhat restricted field, he has left but few superiors, and his presence will henceforth be painfully missed at our congresses; and so too will that fund of archæological and architectural lore which was always at the service of his many friends.

Mr. Parker's fame will probably rest most popularly upon his first literary work, the well-known "Glossary of Gothic Architecture," published in the very earliest years of the "Gothic revival," now nearly half a century ago. There are few living architects who will not gladly own that a very large proportion of their knowledge of Gothic architecture was gathered from the pages of this the earliest, and in many respects the best, work on the subject.

It was Mr. Parker's good fortune to be associated in the production of the "Glossary" with such draughtsmen as Blore and Delamotte, and such an incomparable engraver of architectural drawings as Orlando Jewitt; and it may be doubted whether any subsequent work of the kind has been embellished by more faithful or artistic renderings of examples of English Mediæval art.

Following the "Glossary," at an interval of thirteen years, Mr. Parker published his "Introduction to the Study of Gothic Architecture," a handy volume, based in some degree upon his earlier work. The completion of Hudson Turner's "Domestic Architecture of the Middle Ages" next engaged his attention, and these works, with an edition of Rickman's "Gothic Architecture," together with a multitude of contributions to antiquarian and other periodicals, provided constant employment for his active mind and facile pen.

For many years Rome absorbed almost all his interest, and his courageous and persistent exploration into the secrets of the early history of the Imperial City were not unrewarded with success. He succeeded, at least to his own satisfaction, in vindicating the historical accuracy of the legends which had previously only been regarded as "legendary." On this his favourite theme his opinions were apt to harden into dogmas, and he grew a little impatient of controversy and contradiction. The list of his works on this subject, headed by his well-known "Archæology of Rome," is a long one, and he has left others "in the press." The King of Italy decorated him with the order of SS. Maurizio e Lazaro, expressly for having "demonstrated" the truth of those incidents in the city's history which had heretofore been regarded as merely fabulous. Pope Pius IX. hailed him as a "benefactor of Rome," and awarded him a medal. Foreign societies were liberal in their recognition of his services to history and art. He was made an Hon. M.A. of Exeter College, Oxford, and Keeper of the Ashmolean Museum; and, what was more prized by him than all,—his own gracious Sovereign bestowed upon him, especially for his researches in Mediæval art and archæology, the Companionship of the Order of the Bath.

We have, on many occasions, freely expressed our regard for Mr. Parker's many estimable qualities, both personal and professional, and we have never shrunk from expressing our dissent from some of his inferences, while fully admitting the trustworthiness of the facts upon which he based them. He was gifted with keen insight, a wide and various knowledge of his subject, a large measure of enthusiasm, and great tenacity of purpose. He was ardent in the accumulation of data; but, in our judgment, the logical faculty was not equally strong in him, and it remains for others profiting by his immense labours to follow and revise, in some points, the lessons he drew from the stores of facts which he accumulated.

Mr. Parker was born in 1806, and educated at the Manor House School, Chiswick. He entered upon the business with which his name is identified in 1821. He married Miss Frances Hoskyns, a daughter of the Rev. J. W. Hoskyns, D.D., and he leaves behind him in works of permanent value, of which we append a catalogue, the evidences of a long, well-spent, industrious, and honourable career.

List of Works by John Henry Parker, C.B.

A B C of Gothic Architecture. First edition published June, 1881.

Introduction to the Study of Gothic Architecture. First edition published 1849.

Glossary of Architecture. First edition published June, 1836.

Rickman's Architecture. Fifth edition. Edited by J. H. Parker. Published 1848.

Domestic Architecture, 3 vols., pub'ished 1853—60.

Viollet le Duc, Military Architecture, translated from the French. Preface by J. H. Parker. Published December, 1860.

The Mediæval Architecture of Chester, 8vo. Published June, 1858.

The Architectural Antiquities of the City of Wells, 8vo. Published September, 1866.

Mosaic Pictures at Rome and Ravenna, 8vo., 2s. 6d., Reprinted from the *Gentleman's Magazine*. 8vo. Published July, 1866. Afterwards incorporated in the volume "Church and Altar Decorations," Part XI. of "Archæology of Rome."

Archæology of Rome:—

Vol. I., containing Parts 1, 2, and 3. Published December, 1873.

Supplement to Vol. I., Part 4, "Egyptian Obelisks." Published December, 1875.

Vol. II., containing Parts 5 and 6. "The Forum Romanum," and the "Via Sacra." Published August, 1876. afterwards published separately.

Part 7, "The Colosseum." Published October, 1876.

Part 8, "The Aqueducts." Published December, 1876.

Parts 9 & 10, "The Tombs." Published August, 1877.

Part 11, "Church and Altar Decorations." Published De ember, 1876.

Part 12, "The Catacombs." Published August, 1877.

Part 13, "Early and Mediæval Castles." In the Press.

Part 14, "The Mediæval Churches." In the Press.

Plan of Ancient Rome. Published March, 1879.

Architectural History of the City of Rome. Abridged from the "Archæology of Rome." Published November, 1881.

A Catalogue of 3,300 Historical Photographs of Antiquities in Rome and Italy, taken under the direction of J. H. Parker. Published 1879.

PORTLAND CEMENT.

Owing to the extending use of this material in modern architectural and engineering constructions any information respecting its chemical constitution and characteristics, the processes involved in its preparation, and the means of ascertaining its value as regards its strength, and its resistance to the effects of the atmosphere, fire, or water, is of the highest importance.

Prior to the exhaustive and systematic tests conducted by Mr. Grant during the construction of the Metropolitan drainage works, contractors knew very little respecting the real qualities of Portland cement, as to its powers of resistance and durability, and it is not surprising that some of the original applications of the material were not successful; indeed, so numerous were the failures that the material was discredited by many. Fortunately, Mr. Grant's experiments left no doubt as to the unquestionable value of the material when properly made and used. The small volume before us, by Mr. Faija, C.E.,*

* Portland Cement for Users. By Henry Faija, C.E. Second edition. (Weale's Series.) London: Crosby Lockwood & Co.

is intended as a guide to the user of Portland cement. The author in the chapter on the weight of cement, as a test of its quality,—usually taken at 112 lb. per striked bushel,—points out that inasmuch as by various means of filling the measure a difference of from 10 to 15 per cent. in the weight of the material can be obtained with the same cement, and as the weight also varies with the degree of fineness of grinding, the weight alone cannot be considered a reliable datum from which to judge of the quality of a cement. It is suggested that the specific gravity might be taken as a guide to the extent of calcination which a cement has received: by this method the two elements of error mentioned as incidental to the weight standard of value are avoided.

The finer and more uniform a cement is ground the better; in properly made concrete or mortar each particle of sand and aggregate should be in contact with cement, and this desideratum can only be obtained when the cement is finely ground,—and here it may be added that the degree of fineness of the sand also and its absolute purity are of equal importance; indeed, unless the same care is observed in selecting the sand for actual use, the chemical and crystallising action of setting is never thoroughly effected. Mr. Grant specifies that Portland cement is to be gauged with three times its weight of dry sand which has passed through a sieve of 400, and been retained upon one of 900, meshes to the square inch.

Mr. Faija mentions a not generally known peculiarity attending the sifting of cement, viz., that when the cement is sifted, the part of the cement which does not pass through the meshes of the sieve has practically no setting power. Mr. Faija concludes from this that cement to be effective must be ground to an impalpable powder, and that granulation is ineffective.

The principal points to be considered in the process of gauging are, first, the careful manipulation of the materials, the proportion of water, and the form of briquette, or the form of cement-mould to be tested. The briquette should be of such a form that the strain under testing shall be entirely one of tension, and the briquette should be easily removable from the clips and mould. The proportion of water to the cement should be carefully arranged,—from 17 per cent. to 18 per cent. of water is the usual quantity for cement,—to be tested neat, or without sand. Slow-setting cements require less water than quick-setting ones. When the cement is mixed with sand, in the proportion of three to one, about nine per cent. of water only is required. Before being placed in the mould, the cement should quickly, and with a minimum quantity of water, be brought into a pasty tenacious mass that will remain in any position it is beaten; by a little practice with a trowel this is easily done.

The cement may now be placed in the mould; the exclusion of the air may be assisted by gently tapping the sides of the mould.

The following are the visible changes which occur during the chemical action of the setting of the briquette after being withdrawn from the mould:—

The water is exuded to the surface to be again absorbed, heat is now generated, resulting from the chemical action, and when this is completed the mould gradually cools to its normal temperature, and is then technically termed set. Of course, the more active the chemical action the higher the development of heat; hence the quick-setting cement developes more heat in a given time than the slow-setting one.

The freedom of cement from liability to contract and expand may be ascertained by carefully examining the mould. If defective in these respects, fine hair-line cracks, or an alteration in the form of the mould, will be apparent. Portland cement should always be kept stacked for a considerable time before it is applied for constructional uses; if used too soon after being made, air is evolved from the cement, causing part of it to shell or flake off.

Formerly, Portland cements were usually tested seven days after being properly gauged; but owing to the fact that many cements have not attained their ultimate strength in that time, twenty-eight days from the date of gauging has become the acknowledged period. The test briquettes are now made so as to have one square inch of sectional area subject to tensional strain, and not 1½ square inch as formerly.

Mr. Faija is not very sure as to the advisability of testing cement with sand,—the plan adopted by Mr. Grant and the German Government,—for the reason that sand of uniform character is difficult to obtain; but this reason is hardly sufficient to outweigh the advantages attending the method of testing the cement with sand, as this test is most decidedly superior in enabling the user to ascertain the quality of cement *when applied*. Moreover, many cements, although having an inferior cohesive strength, show a superior adhesive strength. The difficulty as to the sand might be overcome by users specifying pure white granite sand which will pass through a sieve of a given number of meshes.

Little is said in the volume before us of the chemistry of Portland cement. Although the exact and complete chemical action involved in the setting of cement has not as yet been defined, it is generally acknowledged to be a combination of the silica with the lime.

The following is an analysis of English (Thames) Portland cement taken in 1881 (Dingl. Polyt. J. 246-539):—

Insoluble	S_1O_2	Al_2O_3	Fe_2O_3	CaO	MgO
2·894	21·307	6·593	5·386	61 459	0·449

So_3	K_2O	Na_2O
1·422	0·437	0·429

=100·376.

The principal constituents are the Silica S_1O_2 and the lime (calcium CaO), and the most active agent in the setting of Portland cement is the Calcic Silicate, S_1O_2, 2CaO. This, by contact with water, produces a substance crystallising in hexagonal plates and playing the chief part in the hardening of the cement. A singular deficiency in Mr. Faija's book is the absence of information as to the adulteration of cement and the means of ascertaining if adulteration is practised.

The material most commonly used for adulterating Portland cement is blast-furnace slag dust. The presence of this substance in cement can be ascertained in three ways.

The specific gravity of Portland cement is 10 per cent. less than that of slag dust. Under the microscope Portland cement forms porous lava-like grey granules; slag dust, vitreous sharp-edged white or greenish granules. Pure Portland cement extemporaneously mixed with 33·3 per cent. of its own weight of water forms a liquid paste, whilst slag dust requires 40 per cent. to 45 per cent. So common has become the practice of adulterating cement with slag dust, Roman pozzolana, glass, flint, trass, &c., that the Society of German Cement Manufacturers has resolved to consider the sale of cement adulterated with more than 2 per cent. of foreign bodies as a fraud on the buyer, unless the nature of the mixture be made clearly known on sale and delivery.

The specific gravity of Portland cement may be taken as from 3 to 3·1. It is of a cold grey colour. The darker it is the more calcination it has received, the lighter the colour the less the calcination. According to Mr. Faija,—"All over-clayed cements have a tendency to contract, never attain any very great strength, and are always quick-setting. An over-limed cement has a tendency to expand, has a tendency to blow, and is always slow-setting. The presence of too much lime is actually destructive.

Mr. Faija says that a good cement should possess the following properties:—

1. Fineness.—To be sufficiently fine to pass through a sieve having 625 holes to the square inch, and leave only 15 per cent of residue when sifted through a sieve having 2,500 holes per square inch.

2. Weight, per striked bushel, to be not more than 116 lb. nor less than 112 lb.

3. Specific gravity to be between 3·00 and 3·05.

4. Set.—A pat made with a minimum quantity of water to set in not less than three hours, nor take more than six hours.

5. Tensile strength.—Briquettes which have been placed in water sixteen or seventeen hours after gauging to carry, at the expiration of seven days, 400 lb. per square inch without fracture, and at the expiration of twenty-eight days from gauging to have increased in strength at least 25 per cent.

6. Expansion or contraction.—Pats left in air or placed in water not to show cracks or other signs of deviation in form.

7. Colour.—The cement to be of a cold grey colour, not to show change whether in air or water.

The chapter on the application of cement, although not sufficiently comprehensive, is of some value. Mr. Faija considers, and with truth, that the great enemy of cement is loam clay or dirt, and lays proper emphasis on the importance of having perfectly clean aggregates. The water should be added to the concrete gradually, whilst the mass is being continuously turned over with a spade, in order that all the constituents may be thoroughly well wetted. It is a mistake to add the water too quickly. Mr. Faija rightly condemns the custom of tipping the concrete into position from a height, seeing that when a barrowful of concrete is so tipped, the larger pieces of the aggregate fall to the ground first, the smaller pieces next, and last of all the mortar or cement, so that the aggregate and matrix become separated, and the value of the concrete is all but destroyed.

The use of concrete applied to walls, beams, or floors is not considered; but Mr. Faija has expressed his views in the instructive correspondence on this subject in these columns, by which this application has been well discussed, and a formula advanced by Mr. B. H. Thwaite. The chapter on the various forms of briquette testing-machines is useful, but not so comprehensive as one could have desired.

In the appendices are a valuable series of tables of tests on the strength of various cements, and also a series of analyses of various cements, clays, and limestones, and tables giving the specific gravities and adhesive powers of cement and building stones. To those who are not in possession of the papers and discussions on this subject contained in the Minutes of the Proceedings of the Institution of Civil Engineers, or of Mr. Reid's valuable treatise, we can recommend this little work. By the following process Portland cements are said to be rendered less subject to atmospheric influences:—The cement materials should be allowed to remain in a cold solution of 1 part ferrous sulphate, in 3 parts of water, for twenty-four hours, after which they are dried in the air. The compound of iron hydroxide formed renders the cement firmer and harder, and less subject to atmospheric influence.

MR. RUSKIN IN THE CLOUDS.

The audience who squeezed and struggled into the lecture-hall of the London Institution last Monday afternoon to hear Mr. Ruskin discourse on "The Storm Cloud of the Nineteenth Century," must have been considerably surprised when they were told at the outset of the lecture that there was no *arrière pensée*, no double meaning concealed behind the title of the lecture; that he had not announced one thing with the intention of lecturing on another, though, as he candidly admitted, it would have been "very like him" to do so. The storm-cloud of the nineteenth century was a physical storm-cloud, which came into existence during the last decade, or a little earlier, patently to Mr. Ruskin's observation, though unnoted by those of only ordinary perceptions. So thoroughly is Mr. Ruskin a *laudator temporis acti*, that, like the man who declared there had been no good weather since the Whigs were in power, he has discovered that in these latter days even sunsets and cloud effects have lost their beauty, and that a special form of storm-cloud has arisen, in harmony with the mean and unrighteous spirit of these latter days. That there were once fine sunsets and grand effects to be seen, even from storms, was made apparent by quotations from Homer and Byron, which left the matter in no doubt whatever, in addition to the evidence of Mr. Ruskin's own observations in earlier life. But in walking from Oxford to Abingdon in 1879, he was disgusted by the formation of clouds in a manner which he had not observed before, and of which no record existed in literature. These were only small clouds, but they formed unexpectedly in a serene heaven, without Mr. Ruskin's leave, and in a manner which displeased and dissatisfied him very much, and were accompanied by a peculiar blighting wind. Since then the phenomena had been constantly repeated in a much more intensely disagreeable form, and in a manner quite different from that in which a good old-fashioned storm or cloud used to do its work. In healthy weather the sun was hidden behind a cloud as behind a tree, but when the cloud had passed the sun came out again as bright as before. But in "the plague-wind" the sun was choked out of the whole heaven all day by a cloud, which might

be 1,000 miles square and five miles deep. And yet that thin, scraggy, filthy, mangy, miserable cloud, for all the depth of it, could not turn the sun red, as a good business-like fog did with 100 ft. or so of thickness. In a coloured drawing which was exhibited of the effect of sunset in entirely pure weather, the smoke in the horizon, though hiding the sun, yet hid it through gold and vermilion. But if they wanted to see what the sun looked like through the plague-cloud they had only to throw a bad half-crown into a basin of soapy water. What was the reason of this? He could tell them a sufficient reason. For the last twenty years England and all foreign nations, either tempting her or following her, had blasphemed the name of God deliberately and openly, and done iniquity by proclamation, every man doing as much injustice to his brother as it was in his power to do; and all prophets had said in all time, in various language, that under such a state of things the light should be darkened in the heavens, and the stars should withdraw their shining. Let us regain the paths of rectitude and piety, and, perhaps, the promise of old would be fulfilled and the windows of heaven be opened again.

Such is an outline of the substance of the discourse which several hundred people listened to with outward seriousness for an hour and a quarter. Not that the lecture was by any means without real interest in parts. The drawings of sunset skies and cloud effects, enlarged by Mr. Severn and Mr. Collingwood from Mr. Ruskin's original sketches, were very fine, and well worth seeing, and the picturesque language in which they were described and commented upon was worth hearing; and in the description of the march of a stupendous mass of cloud, as he one day saw it, sweeping over Westminster, "precipice keeping pace with precipice," and the Victoria Tower looking "like a mere lamp-post" in front of it, Mr. Ruskin was at his best of poetic and fervid word-painting. Very amusing, too, in a sense, were his schoolboy jokes and skits at the men of science, and very edifying they must have been to two or three of the leading men of science of the day, who were prominent amongst the audience. In one happy moment the lecturer came very near scoring off the "men of science," when he convicted them of using "vibratory" and "undulatory" as synonymous terms in reference to the theory of light; but he spoiled it by going into detail, and describing wave-action in water as a process by which the water was taken from the trough of the wave and placed on the crest, which is by no means a true definition, unless in the case of a breaking wave, where the upper portion of the mass of water is impelled over the lower through the check given by the shore or rock against which it breaks. In ordinary wave-action, the same particles of water rise and fall perpendicularly, and are alternately trough and crest. He went beyond his tether again in asking scornfully what vibratory motion there was in a billiard-ball, for example? Perhaps Sir William Thomson could give him a little information on that point. Mr. Ruskin's positive assurance that insight dwells only in his own mind, and that all who differ from him are "blockheads," gives, no doubt, a certain point and vivacity to his discourse, though that is not the kind of thing that people ought especially to look for in a lecture given at an important educational institution. But when we turn from the occasional bursts of eloquence which were impressive, and the numerous wrong-headed sarcasms which were amusing from their very absurdity, to consider what was the real scope of the whole bundle of talk, one can only express astonishment, not unmixed with contempt, at the sort of follow-my-leader fashion in which a number of people will scramble after each other like so many sheep, to hear a man who has got a name deliver out to them sentiments and opinions which, when divested of the cloud of prismatic word-painting in which they are wrapped, appear to be little better than "old wives' fables."

Herr Julius Pintsch.—The German technical press has given prominence to the death of Herr Julius Pintsch, whose efforts to accomplish the illumination of railway carriages by means of compressed gas met with deserved success at last year's Berlin Hygienic Exhibition. There was then exhibited a marine buoy, where a receptacle for 360 cubic feet of gas would keep a light burning constantly during four months.

ON "COLOUR DECORATION." *

In laying down rules for practical decoration, the subject must be divided under various heads. There are certainly rules which are generally applicable, but there are also those which must be applied under conditions of limitation. Among the latter must be classed those which concern the purpose of the room or building, the style of architecture employed, and the manner of lighting both by day and night.

Let us take first the rules of general application. Under this head may be ranked those which affect the expression of proportion and of form, and those which concern harmony of colouring.

That the proportions of any interior may be very largely affected by the scheme of decoration is, of course, very well known to you, as are also, no doubt, a few of the broader rules bearing on this axiom. It may also not have escaped your observation that they are constantly disregarded, even by architects, when they dabble in colours, who seem too often to be carried away by a love of some particular arrangement of wall surface; sometimes a wide frieze, at others a high dado being indispensable to their content, whatever the height, or size, or style of the room. Now, I shall ask you to make it your fixed rule to begin by considering the size, proportion, and other conditions of your room, and then to determine whether it is desirable to express or add to its apparent height, or its apparent width and size. You can, if necessary, considerably increase either, but not both. It will generally be found that, speaking broadly, what you add to one you take from the other. When this point has been decided, you will find it a much easier matter to deal consistently with the arrangement or division of the surfaces presented to you. Observe, I by no means insist that a room must be made to look higher, but I do insist that you should know whether you intend it to look higher or not, and that your distribution of surface decoration should not be entirely regardless of proportion.

It is a very common fallacy that to colour a ceiling is to lower it. Still more often is this result expected if projecting ribs or mouldings be added to divide the blank surface. Yet it may easily be shown in argument, as it is constantly exemplified in practice, that the opposite effect is quite as often produced, colour being the determining agent. Let us assume the walls of a small private library, 12 ft. high, to be hung with one of the embossed leather papers now in frequent use: the pattern brown and gold on perhaps a warm green ground; the bookcases below, of oak or walnut wood, with their contents, maintaining a quiet similarity of general tone. The cornice is, say, 9 in. deep. If you leave it a light tint and the ceiling plain, the room will appear quite 9 in. lower than it would were the cornice brown, like the bookcases. And if this brown is continued on to the ceiling by means of wooden ribs, the room will gain at least another 6 in. in apparent height.

The fact is, that the point at which the attention is arrested by a marked contrast is that by which the eye assesses the height; and since the mouldings of the cornice project inwards to the room, even *more* apparent height is gained (than is marked in vertical distance) when the contrast is placed high, since advantage is taken of an apparent perspective.

On the other hand, if it be desired for other reasons to retain the wooden ribs and cornice, yet not to add to the apparent height, a corrective is readily applied in colour,—either in the form of a narrow frieze, of sufficiently emphatic contrast, below the cornice, or by contrasted relief of colour at the same point as the cornice itself. Even a line of gilding may suffice.

In the same way the influence of a wide frieze or a dado on the proportions of a room is largely controlled by the colouring. A wide frieze may be used of the same colouring or even of the same depth of tone as the wall below, without materially affecting the apparent height; but a very small amount of contrast in tone will be sure to tell in the case of a large plane surface. Hence, if a frieze with some contrast be used where height cannot be sacrificed, it is essential to place its brightest contrasts as high up and as near the cornice as possible, lest the eye be arrested at the bottom, and the frieze itself, together with the cornice, be relegated to the ceiling. Some rooms are high enough to bear this sacrifice of wall, in which case they largely gain in apparent width and space.

So much for the horizontal lines, which are the most important; but the vertical lines and the manner of dealing with them must not be forgotten. Perhaps, during the last few years, they have been rather unreasonably ignored. Of course "pilasters" are not always essential or desirable,—in many rooms they are absolutely out of place,—but your modern "art decorator" seems to have forgotten that such a feature is available anywhere; and your modern "lady of taste" hears you utter the word "pilaster" with the same suppressed emotion which she would exhibit if she heard a sailor swear,—she only excuses it "as language belonging to the profession." My advice to you is by no means to discard so useful a means of expressing height or symmetrical arrangement. It is especially useful where you want the dignity of architectural expression in a limited space. In the case of a long unbroken wall, pilasters are a useful means of preventing that apparent sagging of the cornice line which is apt to trouble the eye, and which the Greeks were so well aware of as to substitute a gentle curve for the weak horizontal line.

I must be understood, when speaking of "pilasters," to use the word in the decorative sense, not in the architectural. I do not necessarily mean a feature having capital and base. A narrow vertical panel, distinguished from the larger wall-spaces which it divides, is equally a "pilaster" to the decorator. If ornamented, its ornament must have a vertical direction.

There are in most rooms certain features which may be made to aid in the expression of proportion. Such are doors, windows, and chimney-breasts. In nine houses out of ten the dimensions of the door have no relation to those of the room. There are many ready methods of getting over this difficulty, such as the addition of door-head or frieze, with capping moulding; or, in some cases, continuing the framing of the door so as to enclose a panel above it, to be treated distinctly from the other wall-surface. Then, again, the windows may, by the arrangement and colouring of the draperies, be made to distinctly influence the proportion. And so with the chimney-breast, a marked feature in most ordinary dwelling-rooms. A sense of size and importance may often be given by treating the whole breast as a part of the fireplace arrangement, or, at any rate, as a distinct feature. Examples of the effect of such treatment will occur to you in several of the old public buildings of France or Flanders. You remember the magnificent one at Bruges; and this arrangement in various forms occurs constantly in the French palaces and châteaux from the Mediæval periods down to the expiration of the monarchy. In the elegant decorations of the "Louis XVI." period, the full height of the wall above the chimneypiece is constantly associated with it in one group; and our own Elizabethan examples are so numerous as hardly to need mention.

I have dwelt thus on the question of proportion as influenced by the colouring and decorative features, because I see it so constantly disregarded, and it appears to me that it should be the decorator's first problem.

After all, it is the ceiling which is in most cases the decorator's great opportunity. Where it is already divided into panels or ornamented in relief his first consideration will be how to do it most justice,—to express it in the best way, and to emphasise the right points. Apart from the actual harmony of colouring, the good management of light and dark tones is of the first importance; to give point without producing patches of colour, and obtain a sufficient uniformity of effect without tameness or monotony. It is astonishing how a ceiling may be lifted out of mere flatness by the judicious disposition of its leading lines. If these are rightly expressed much may be forgiven in minor defects of ornament or colour. The ceilings of the great majority of our rooms are flat, owing to the exigencies of space, no less than to those of cost. Let us therefore con-

* A paper by Mr. John D. Crace, read before the Architectural Association on the 1st inst. In the course of his prefatory remarks Mr. Crace referred to two former papers read by him before the Association on the subject of colour decoration, and in which he treated the matter of its study from two points of view,—one as affected by the study of art examples, the other as affected by the study of nature. See *Builder*, vol. xxxii., p. 245 (March 21, 1874); and vol. xxxv., p. 613 (June 16, 1877).

sider what variety of effect is attainable with ceilings of flat construction.

In the first place, where a perfectly flat plane of plaster is presented, there are the alternatives of treating it with colours alone, or of previously subdividing it by mouldings or relief ornament. The latter treatment is the one which obviously recommends itself where there is not too close a limit of cost, and especially if the area of ceiling be large. It is indeed most difficult to treat satisfactorily, with colour alone, a large area of plain flat ceiling, and such treatment should really be limited to ceilings of small dimensions. I will return to this point. The methods of division are numerous enough, and the decorator will be guided by several considerations in deciding on which to adopt. The amount of relief must be determined, firstly, by the height and size of the room, especially by the height, but also by the depth and richness of the colouring intended for the walls. Here, again, comes in the question of the ultimate use of the room; for a light and gay colouring is not compatible with the use of heavy mouldings or deeply-recessed panels in the ceiling. This is one reason why the relief ornament of the ceiling should either be designed by the decorator or in co-operation with him. To be successful it *must form a part of the colour scheme*. The light and shade of the relief ornament and mouldings are a most important factor in any scheme of colouring.

Like the walls, a ceiling may be so divided and subdivided as to materially affect its apparent length and breadth, and upon the same general principles. This, whether with or without any relief of mouldings, but preferably by their aid. It has already been explained that height is to be given by attracting attention to some feature high up in the cornice, but you may go further and place your decisive contrast in the margin of the ceiling itself. From this point you may, if the area of the ceiling be square or nearly so, either maintain a flat or horizontal effect, or you may impart to it an appearance of rising from wall to centre.

Where the intention is to maintain the effect of a horizontal ceiling the principal lines (if firmly expressed) must be distributed with even impartiality over the surface in a design consisting of a repetition of geometric forms, or of forms having the appearance of repetition, or monotonous in their degree of relief. Or, again, very marked straight lines, taken from cornice to cornice across the ceiling, will emphasise the horizontal sufficiently.

When, on the contrary, it is wished to raise your ceiling in the centre, it will be necessary to take care that your main lines are clearly marked by vigour of relief or of colour contrast, and that their arrangement expresses a growth from sides to centre. Your colouring must be so adjusted as to keep, firstly, the sharpest contrasts to aid in expressing their growth; secondly, the weight of colour gravitating towards the angles. In like manner the ornamentation, whether in colour or relief, should be made to assist in the effect of growth towards the centre; in fact, to flow with the same motive or tendency as it should have were the ceiling actually concave.

It may be useful here to lay down an axiom in reference to moulded ceilings. It is this:—"For light tints of colour, and with bright, gay tones, the relief of moulded surface should be very moderate. Strong relief of moulded surface is compatible with the use of powerful colour in masses, and with dark low tones. It may, moreover, be taken as a general rule for any situation that "strong shadows are incompatible with the use of light tints."

What I have already said as to moulded ceilings applies almost entirely to the distribution and character of the dividing main lines. The ornamentation of the intervening spaces may be left almost untrammelled by rules, if it but retain a subordinate position, except only where special accentuation of the general design is required.

Now, providing that the surfaces be not too large, precisely the same general rules will apply to the decoration in colour only of plane flat ceilings, without the aid of relief. Lines of expression must be used of colour so firm as to lead the eye with decision, and to take the place of the mouldings whose direction we have been considering. The emphasis yielded by light and light and shade being lost, the whole treatment must be lighter and simpler. A subdivision into monotonous repetitions of form is rarely pleasing in colour only. A greater freedom is, for the most part, desirable. Once the spectator is aware that it is by the brush alone that the surface has been treated he expects, to some extent, the freedom of hand that the brush suggests. You find this admirably exemplified in the Greek work of Pompeii, and no less in many of the best works of the Renaissance. This freedom applies perhaps more to the treatment of ceilings than of walls; but in a less degree it applies to walls also, if other conditions do not impose some severity of treatment.*

ARTISANS' AND LABOURERS' DWELLINGS.†

THE BUILDINGS OF THE PEABODY TRUST.

THE present condition and future improvement of the dwellings of the poor is a subject which may be compared not inaptly to a patient generally out of health, and requiring special treatment for its restoration. It has lately occupied more than usual attention, in consequence of the notice which has been attracted to it by the able and comprehensive articles of Lord Salisbury and Sir Richard Cross.

Much has been both said and written regarding it since these articles appeared, and many important suggestions have been made at the public meetings which have been summoned to discuss it, but these suggestions are, as they were necessarily intended to be, only general, and the working out of the details required to turn them to profitable account has been left to the consideration of others.

Before proceeding to inquire of what these details consist, and how they can be best applied, it may, perhaps, be well to endeavour to obtain as clear a conception as we can of what is meant by "the dwellings of the poor." To render this less difficult, some definition is required, in the first place, of the meaning of the word "poor."

It may be taken for granted that there are few who will venture to regard the poor as a homogeneous whole,—a sort of conglomerate of human beings to be treated as if they were altogether, or even in a great degree, without individuality. If, therefore, the whole is to be benefited, it must be admitted that the parts which comprise it have to be considered, and must be dealt with separately. These parts, sections, or classes are so numerous, that it would be very difficult even to specify them, and to describe them fully and accurately is, indeed, almost impossible, owing to the variety of opinions which is held regarding them. Those who compose them differ widely in their habits, modes of living, and wage-earning powers, and these differences are increased by the circumstances of locality and occupation. A merely superficial acquaintance with them often leads to conclusions which are far from accurate. Opinions are formed from outward appearance and other misleading characteristics, which become modified after more experience, but which often create a good deal of mischief in the meantime. A short time ago costermongers and sweeps became objects of especial sympathy, and strong opinions were expressed in consequence of no provision being made for their especial convenience and accommodation. Too often these members of a respectable fraternity would be classed among the very poor, because they are so often very far from clean; but they would be indignant indeed if they knew the opinions expressed upon the position they are supposed to occupy in society. Were this position dependent solely on their annual income, they would rank far above many a young curate, barrister, or aspiring artist. Their "weekly" wages certainly vary, but during the summer months a costermonger's earnings are very considerable, and a provident sweep may become in these days a landed proprietor. They are among the aristocracy of the poor, and generally held themselves superior to the attractions offered by the buildings we are about to describe. Among the most really poor are the scavengers; but the philanthropic public do not care very much about them, partly, perhaps, because their appearance is somewhat piebald, clean and dirty alternately, according to the weather. They are, however, deserving of more sympathy than they receive, because they are generally men whose bodily infirmities unfit them for other labour, and their earnings are precarious: the weather which contributes to the peculiarity of their appearance, unfortunately affects their pockets much more seriously.

Recognising, therefore, the great variety of opinion which exists as to the proper classification of the poor, and believing that so long as these various opinions influence those to whom the subject of their dwellings is one of especial interest, so long will there be a difficulty in dealing with it in a satisfactory and practical manner, let us inquire whether there be one opinion among this great diversity in which all can agree, and of whose truth there can be no question. Who will not willingly concede that of all the classes which constitute the poor, two sections, and two only, stand prominently forward, and declare themselves to be the most important, namely, the poor who work and the poor who do not? It is with reference to the former class,—the poor who work,—that the following remarks are offered.

The working or industrious poor may be defined as those who endeavour to obtain a living by honest exertion, who receive payment for their labour with more or less certainty all the year round, and whose wages are sufficient to keep them free from parish relief. This class is very large, and in dealing with it it is necessary to divide it into sections. This necessity has been proved by experience. Subdivision lightens the labour with which all are acquainted who undertake any important philanthropic work, and, without its aid, it too frequently happens that the best intentions will only result in failure and disappointment. If one subdivision or class be selected as the recipient of the benefits to be conferred by one individual, or one associated body of individuals, the probabilities are that much substantial and lasting good will be accomplished, provided that as full information as possible be obtained in every particular relating to their antecedents, habits, and occupations, before endeavouring to supply their wants.

The class provided for to try the dwellings we are about to describe is that which consists of artisans and labourers, whose weekly earnings do not exceed 23s. or 24s. per week. This wage-earning limit relieves the work to be undertaken of much of its difficulty, but it does not entirely remove it; for as Sir Richard Cross has truly observed in his admirable article in the *Nineteenth Century*, people have to be dealt with as well as houses; the people to be dealt with in one part of London may be (and experience shows that they are) "totally different in character from those who have to be dealt with in another part, and as with people, so with houses, it is impossible to apply one general rule in all cases." Frequent intercourse with the working man, to whichever class he may belong, amply confirms this statement. It is remarkable how the habits, ideas, and what may be termed the social position and prejudices of men earning the same wages, may differ in different localities, especially if engaged in different occupations. And in this consists the difficulty as to how the wants created by this great variety of requirement are to be met in the most judicious and satisfactory manner. It is an old proverb, but a very true one, that "habit is second nature." And as habits are not altered by mere change of dwelling, if the improvement offered by the dwelling is to be acceptable, the accommodation must, to a certain extent, harmonise with the requirements and habits of its occupant. Moreover, the improvement must be gradual; otherwise those who would make too great and sudden a change, and attempt too much, will end after experiencing loss and disappointment in accomplishing nothing. It will hardly do to accept as an axiom that every working man must have a self-contained tenement with a living-room, scullery, wash-house, closet, and at least three bed-rooms for himself, his elder children, and his babies. Those are luxuries which, were they at his disposal, would in many cases add nothing whatever to the real comforts of his life, unless he were first educated, through custom, to use them without abuse. To place him in such a dwelling, after occupying a tenement of one or at most two rooms in a slum at the far East of London, where he and his wife and family have been in the habit of herding together without any of the appliances of domestic decency or comfort, would be simply to make him miserable; and instances can be

* The remainder in our next.

† A paper read by Mr. H. A. Darbishire, F.R.I.B.A., Architect to the Peabody Trustees, at the Parkes Museum, on the 31st ult.

quoted of entire families of young and old preferring to remain crowded together in one room not more than 10 ft. square, and divided by only a miserable curtain, rather than exchange it for the better accommodation of a so-called model dwelling. Such people cannot be expected to know how to accustom themselves all at once to the conveniences of decent living, the use of which they hardly know. It is a mistake, too, to assume that he will be grateful, at all events at first, for any extension of his domestic limits, especially if this be attended by the very smallest additional claim upon him in the shape of rent. A single room, which serves him as "parlour, and kitchen, and hall," has its charms, which a larger tenement may deny him, and one of these, and to him a very important one, is *warmth*. Cold and fresh air are too often regarded as abominations and plagues to be avoided,—an antipathy supposed to be attributable to the fact that, while he is at work during the day his body becomes warm, and is kept warm by his exertion, and when his labour is over the blood loses its high temperature, and he becomes very sensitive to cold. Again, with regard to his rent, it is so serious a draught upon his earnings that, if he can see any means of reducing it, he will certainly avail himself of them, and it is with difficulty that he can be tempted to increase it by the offer of additional space or of the luxury most esteemed by his wife, ample washing accommodatien.

Having regard, therefore, to his wants, habits, and inclinations, it is necessary to render his dwelling acceptable to him under difficulties which are not always very easily overcome. The number of the rooms must not be more than he can use for living purposes. Their size must not be too great, nor their shape too irregular to prevent his scanty furniture from being placed and easily adapted. The general structure must be solid and plain, and the fittings simple and substantial, free from complication as much as possible, and capable of easy repair, especially the cooking arrangements, the water-supply; and, lastly, the rent must be low, and well within his means.

Before entering into a description of some dwellings which have been provided by the Peabody Trustees to meet these requirements, at least to some extent, a few words must be said regarding the sites upon which it is most desirable to build. If it be required to be freehold, or if it be sought in a particular locality for the convenience of one particular class of poor, it may be both very difficult to obtain and very high in its price. The character of its tenure may possibly affect the construction of the buildings which are to be erected upon it. Those who would be disposed to build very substantially upon a freehold site might hesitate to do so upon one that was held under an unfavourable lease. It may be subject to a high or a low ground-rent; it may be in a crowded thoroughfare or in a suburb which can only be reached by railway, and therefore useless for the purpose of dwellings for those who are obliged to be near the manufactories and shops which afford them employment. It may be surrounded by lofty buildings, which not only impede the free circulation of air, but exclude the daylight at an early hour, and render it unfit for the use of those who are engaged on any kind of work at home: it may be covered by old buildings, which, with any subterranean works connected with them, must be cleared away before it can be available for the new; it may possess a valuable subsoil, or it may prove to have been the receptacle of all the refuse of the neighbourhood for years, which must be removed, lest on its being disturbed its miasma produce sickness and disease. Two important requisites, however, it must possess,—namely, sufficient size, and a convenient shape.

It has been calculated that the population of London and its suburbs is little short of four millions and a half, and that of this number three million live in cottages only two stories high. As this huge population is daily receiving a large increase to its numbers, and as each foot of building space is daily rising in value, it is evident that two-story cottages must be abandoned in favour of buildings which occupy a smaller area and provide much greater accommodation. After the most economical plan of one of such buildings or blocks has been determined, the site which accommodates the greatest number at the least sacrifice of space, air, and light, is the best and most desirable. The superficial contents of two sites may be the same, but the shape of one may render it only half as available for building upon as the other; therefore area alone cannot be accepted as a correct standard by which its value can be estimated.

The dwellings referred to as having been provided for the artisan and labourer class are built in blocks, each occupying 2,197 superficial feet. They are 75 ft. 9 in. long; their greatest width is 33 ft.; and their least width 26 ft. 9 in. Their height is 48 ft. from the ground-line to the eaves of the principal roof. These dimensions allow each block to contain fifty rooms, viz., ten on each floor, exclusive of cupboard spaces, sinks, and water-closets. They are convenient, and are useful in supplying a datum by which the accommodation of a site intended for the erection of this class of associated dwellings can be tested; for this reason they have been adopted and generally adhered to as far as practicable. The blocks are generally detached, and wherever the conditions of the site admit of this arrangement, it is very desirable to adopt it. Detached blocks should be at least 15 ft. from each other, and from their surrounding boundaries, unless these be public thoroughfares. Where it is necessary to economise space, two or more blocks may be joined together longitudinally, but each extension in length should be equal to that of an entire block, viz.,—75 ft. 9 in. if possible. When this cannot be done, the extension should not exceed 18 ft., which allows two additional bedroom, 9 ft. wide, to be added at each end. If the extension be greater than this, the bedroom accommodation will be undesirably increased, because there will be an unnecessary addition to the size of the tenement, and a certain loss of remunerative rent. From this it will be seen that the economical disposition of the blocks is very dependent on the facilities offered by the site. If it be too small, either full-sized blocks cannot be placed, or larger and less remunerative ones must be provided; and if its shape be irregular either space must be lost or the architectural disposition of the blocks will suffer.

Each block contains a basement, with two dust-cellars, and a store for the general use of the tenants; five stories of dwellings; and an attic, in which the washing and drying accommodation is provided. The basement, which occupies only a small portion of the block, and is situated immediately under the staircase, has a separate entrance at the back, so as to allow of the direct removal of the dust from the cellars. These receive the dust from two shafts 14 in. by 9 in., ventilated above the roof, and furnished at each floor level with iron trays, or hoppers, into which the dust can be swept by the tenants. The shafts are situated on each side of the staircase, so as to be equally accessible to all the tenants, and the hoppers are arranged so as to prevent, as far as possible, any large obstruction from being introduced into the shafts, but the most carefully-considered precautions are sometimes skilfully evaded, and broken pieces of furniture, old clothes, pots, pans, kettles, brushes, and other household refuse find an entrance, and often cause serious trouble before they can be successfully removed. In order to meet this difficulty, square holes, fitted with iron frames and doors, very similar to ordinary soot-doors, are provided at intervals throughout the length of the shafts, so that when a stoppage occurs its position can be ascertained and removed. The cellars are emptied once a week, and the separate entrance already mentioned facilitates the removal of the dust, without causing annoyance to the tenants. The remaining portion of the basement, not occupied by the dust-cellars, serves as a store for perambulators, and other cumbrous articles of furniture, which the tenants cannot accommodate in their rooms, and are unwilling to part with.

The ground-floor is raised 1 ft., or two steps above the datum, or ground line. The principal entrance is in the centre, and affords direct access to the staircase, which is opposite to it; this is 7 ft. 9 in. wide, and extends from basement to attic. On each side of it are recesses, leading from a central landing-space to the water-closets and sinks.

The arrangement of the dwellings is not uniform, and they vary in accommodation. Some consist of three rooms, some of two rooms, and some of only one; where the datum dimensions of the blocks cannot be adhered to with advantage four-roomed dwellings are provided, but these are the exception. This variety of accommodation has several advantages. A working man, if unmarried, may first become a tenant of one of the single-roomed tenements which will supply him with all the conveniences a single man may require; should he marry he finds that he must leave this for a dwelling of two rooms, which will answer his purpose so long as his children are small, but, as they grow up and can add to the family store by their weekly earnings, however small, his two-roomed dwelling must in its turn be given up for one of three or four rooms. This ability to increase his house-room without having to leave the building in which he first established himself is found to act as a strong inducement to him to remain in one locality and to identify himself with it and his fellow-tenants. This all tends to increase his self-respect, and creates a feeling of attachment to his home which is not only beneficial to himself, but has a good influence on those with whom he is associated either during his hours of labour or relaxation. It not unfrequently happens, also, that his original tenement of a single room is taken by an old or dependent member of his family who wishes to be near him, and who is unable or unwilling to provide other accommodation. There are several instances of groups or colonies of families in the same block which could not occur were the dwellings uniform in size or arrangement.

All the rooms are 9 ft. 6 in. high from floor to floor; the living-rooms are 13 ft. long by 11 ft. wide; the bed-rooms are generally 13 ft. long by 9 ft. wide. Though these dimensions may not be the same in all cases, any departure from them which it may be found expedient to make is not appreciable, for they give a regular shape to the rooms and allow a fair share of wall space for the convenient disposal of the larger items of furniture. Carpets can be easily adapted to them without the necessity of cutting or fitting, which is a consideration much appreciated, especially when the occupation of the tenant necessitates a frequent change of residence. Moderate-sized rooms are more manageable than large ones, and two small rooms are more easily kept tidy than one large one. In a large room the space is generally wasted, the furniture carelessly disposed, and the heavier and more bulky portions are huddled together so as to make their removal a matter of difficulty on cleaning days. In small rooms space must of necessity be economised, cumbrous pieces of furniture are consigned to the store in the basement, and the wall spaces are sufficient for the disposal of those which cannot be dispensed with. Unless the furniture of a room be easily movable the probability is that dirt will be suffered to accumulate; and this probability will be strengthened if the room be insufficiently lighted. One large room is less likely to be well lighted than two small ones, and, as even a little sun will discover dust in a small room where a good deal would be wanted to find it out in a large one, so there is a better chance of general cleanliness and order being established in the one case than in the other. Again, in two rooms there are sure to be two windows; in one room the chances are that there will be only one; and, although fresh air may be jealously excluded during the later hours of the day, when work is over, a favourable moment may possibly occur when one of the two windows will be accidentally left open and establish a current between itself and the fire and the entrance door, which will be beneficial to the health of the occupants.

Each living-room has a fireplace 3 ft. wide, furnished with a cooking-range, containing boiler, hot-plate, and trivet. The fireplace,—that is, the portion of the range which contains the fire,—measures 8¼ in. by 8¼ in. at the top, 8¼ in. by 4¾ in. at the bottom, and is 9 in. deep from the bottom to the top fixed bar, and 13½ in. from the bottom to the top fall-down bar, which serves as a trivet. Before these dimensions were adopted, the space occupied by the fire, which had been purposely made large to encourage the ascent of the smoke, was considered extravagant as requiring too much fuel, and smaller dimensions created difficulties as to the disposal of the necessary pot and kettle, which, for some unaccountable reason, are almost invariably so large as to cover the entire fire-space and prevent the smoke from finding its way up the chimney. Even the adoption of these dimensions, which resulted from repeated and patient experiment, has not met with the entire success which was anticipated. The large pot and kettle, the scanty and defective fuel, and not unfrequently inattention to the

diameter of the flue, all contribute to a state of discomfort which might be mitigated or altogether banished by the exercise of a little more care and a little less indifference on the part of the tenant. In order to obviate it as far as possible, the living-rooms on the topmost story of dwellings are provided with close ranges instead of open fires, and their flues are furnished with purposely-made chimney-pots. Smoke is almost always a trouble in the dwellings of the poor for the above reasons, but unless it be very bad indeed, it is one to which less objection is made than to others which might be regarded as much less serious.*

LYCIAN ROCK TOMBS.

PROFESSOR NEWTON continued to discourse on this subject in his fifth lecture on "Monuments of Lycian Art,"† delivered at University College on the 1st inst. Speaking on the so-called *block-haus* tombs, he referred to a portfolio of drawings made by Sir Charles Fellows, among which was a section of a tomb at Myra, showing the chamber within the structure in which the body was deposited, there being another chamber in the lower part of the tomb, entered by a square aperture. This aperture was obviously too small for the insertion of the body. What, then, was its purpose? In his opinion it was intended for the reception of the offerings brought to the dead. On this supposition the heavy top of the tomb would have to be placed *in situ* after the body of the dead had been placed in the chamber, and it would of course have to be lifted and replaced whenever another body was deposited in the temb. The tomb known as the Chimæra Tomb, in the British Museum, was so called because the principal subject upon the carved portion of the roof was Bellerophon slaying the Chimæra. On other parts of this tomb were a battle scene, and a pacific scene, representing the crowning of a youthful athlete. The Lycians attached great importance to these agonistic victories, and it was singular to note the frequent recurrence of such scenes in their sculptures. When we examine the subjects of the friezes on these tombs we find that they possess in common this general feature,—that the principal subject is a battle scene, or something else strictly personal to the life of the deceased, the figures represented as mourners being subordinated to the others, as if mourning were the least part of what was due to the dead. Without doubt the main idea which dictated the subjects of the sculptures was that of pleasing the dead, as well as cheering the living. In the Chimæra Tomb in the British Museum, Bellerophon was represented on both sides of the structure, in his chariot of four horses driven by a charioteer. The Chimæra was under the feet of the horses, and Bellerophon was aiming at it with his spear. That was not the ordinary way in which this subject was represented. The ordinary representation made Bellerophon a horseman, mounted on the famous winged horse Pegasus, and attacking the Chimæra with a lance. At first sight it might, perhaps, be thought that the representation of Bellerophon, in a four-horse chariot, represented a version of the myth peculiar to Lycia, but the lecturer was not inclined to think that was the case. The principal points of this myth of Bellerophon were made up from several sources. First of all there was the story, well known to Greek scholars, told by Homer, which dealt chiefly with Bellerophon's adventures in Lycia. Then again there were the myths which connected him with Corinth and Sicyon. Now a constant, and, indeed, perpetual type on the silver coins of Corinth was the Pegasus, while on the coins of the neighbouring city of Sicyon a constant type was the Chimæra. Corinth claimed descent from Bellerophon. According to Apollodorus, Bellerophon was the son of the Corinthian King Glaukos, and grandson of Sisyphos, or, according to another myth, son of Poseidon. He committed a murder, then fled to Prœtus, King of Argos, whose wife, Antæa, fell in love with him, but her advances meeting with no response, she made a false accusation against him, and demanded that he should be put to death. Prœtus sent him to Jobates, king of Lycia, with a sealed letter. Jobates sent him to kill the Chimæra. Bellerophon on Pegasus killed Chimæra with his arrows, and Jobates then sent him against the Solymi and afterwards against the Amazons. He was victorious in both those contests, and on his return, being attacked by an ambuscade contrived by Jobates, slew all his foes, the bravest of the Lycians. Homer described the later life of Bellerophon, saying that he drew on himself the hatred of the gods and wandered through the Aleian plain. It should be noted that although Homer did not mention the story of the Chimæra slain by aid of Pegasus, the myth occurred on coins, gems, terra-cottas, and Lycian reliefs. Bellerophon was stated to have assisted Prœtus in his claims on the kingdom of Argos. The Lycians were said to have made those remarkable Cyclopean fortifications at Tiryns. On the coins of Sicyon the Chimæra was represented to be a monster having the head of a lion, the body of a goat, and the tail of a serpent. Similar representations had also been found on vases and monuments. Such a representation of the Chimæra was to be seen on an archaic terra-cotta now in the British Museum. According to one legend, the monster breathed forth fire, and Bellerophon destroyed it by passing lead into its mouth, the lead becoming melted by the breath of the beast, and being swallowed. In reference to the origin of this myth of the Chimæra, it should be noted that a commentator on Virgil mentioned the existence of a mountain in Lycia which had a volcanic fire and which was frequented by lions towards the top, by goats in its middle parts, and by serpents at its foot. Other ancient writers spoke of fire on a mountain on the eastern coast of Lycia, and of a temple dedicated to the god of fire, but little more light was thrown upon the subject until Sir Francis Beaufort surveyed the coast of Lycia. Being not only an extremely good hydrographer, but a very well-read man, Beaufort was induced to look out for the fire on the mountain spoken of by the ancient writers, and he succeeded in finding it, issuing from a fissure in the rock, which exhibited marked evidence of what geologists called Plutonian disturbance. The fire was afterwards seen by Spratt and Forbes. Forbes, who was a geologist, was of opinion that the gas which supported combustion at the fissure may have been evolved by the collision of limestone with Plutonian serpentine and stated that in the Apennines the same phenomenon occurred with the same geological formation. Another traveller, Mr. Albert Berg, a German artist, who was sent in 1854 by the King of Prussia to examine the fire and make drawings of the site, had published an interesting account of this fire in the *Zeitschrift für Algemeine Erdkunde* for 1866. It was not difficult, by the light of these authorities, to come to the conclusion that the Chimæra was a monster suggested to the fertile Greek imagination by natural phenomena. Reverting to the tombs themselves, the lecturer mentioned one at Myra with a *block-haus façade*. It consisted of an ante-chamber cut in the rock, within which was an inner chamber, constituting the tomb itself. On entering the ante-chamber the following reliefs were found,—on the left, a male figure, bearded, and holding in one hand a drinking-horn, in the other a cup (Texier, pl. 230). This figure, in the facsimile in Fellows ("Lycia," p. 198), is painted,—the body a flesh-colour, the lower half draped in a violet mantle, the ground red. Next to him, and close to the door leading to the inner chamber, is the figure of a boy, quite naked, holding in his hand a stick, and with his head shaved all but a tuft (Texier). On the opposite side of the ante-chamber is a seated female figure, behind whom stands a female attendant, in front of whom stands a naked youth, holding in his left hand a strigil and arybollos. His head is shaved all but a tuft (Texier, pl. 229). The ground on which this group is relieved is painted blue. The figure of the youth has the natural colour of flesh. The female figure wears a red chiton and a mantle, in which white, violet, and saffron are combined. The female attendant has a white chiton and yellow mantle (Fellows, p. 198). Outside the tomb, on the left, is a bearded male figure, the lower half draped, and holding in his right hand a sceptre sculptured on the rock. On the right of the entrance outside is a draped female figure, holding by the hand a smaller female figure (Texier, pl. 231). At right angles to this group is a male figure leaning on a staff, to whom a female brings an offering. On his other side is a smaller draped male figure. Two tombs excavated in the rock at Telmessus,—one having a Doric and the other an Ionic façade, having been referred to, the lecturer suggested that the interior arrangement of these rock tombs might throw some light upon the probable internal arrangement of such structures as the Tomb of Mausolus. The evidence afforded by the tombs of Etruria and other parts of Italy was also useful in this connexion. At Tlos, a city of remote antiquity, situate near the River Xanthos, and discovered by Sir Charles Fellows, there was a most interesting tomb with a tetrastyle portico, which was curiously left unfinished. Inside the portico, on the left hand, was a relief, also unfinished, having for its subject Bellerophon slaying the Chimæra, and there were animals on each side of the doorway. Tlos or Tros was said to have been the progenitor of the Trojans, and there must have been some connexion between the Trojans and Lycia; for Homer told us of two Lycian heroes, Glaukos and Sarpedon. A rock-tomb at Pinara was next described. It had a pediment and portico. On the right-hand side was a seated female figure receiving something from an attendant. On the left-hand side were three standing figures. Below the dentils was a frieze; on the left a mounted figure, and several figures in front and behind him; on the right, figures apparently dancing, or warriors escorting captives. Inside the portico, on the opposite walls, were views of cities (Fellows, p. 141). According to Spratt, the ruins of Pinara are the most considerable in Lycia. The Lycians, according to Stephanus, called all round things "Pinara," and Spratt reports the existence of an almost cylindrical hill there. Pinara was a colony from Xanthos.

Professor Newton's next lecture, to be delivered this Friday, the 8th inst., will be on the great inscribed stele of Xanthos, of the four sides of which there are casts in the British Museum.

* The remainder in our [illegible]

† See *Builder*, pp. 92, 142, [illegible] *ante*.

POLICE AND FIRE BRIGADE STATIONS, NEWCASTLE-UPON-TYNE.

WE illustrate this week the design placed first by Mr. Worthington, the architectural assessor retained by the Committee to advise on the merits of the drawings sent in for this competition. The instructions to architects were for a combined Police and Fire Brigade Station, with residences for two superintendents and barrack accommodation for constables and firemen above; the cost of the building not to exceed 7,000*l*.

The amount of accommodation required, and the limited area of the site, necessitated the utmost economy of space in the internal arrangement of the building. The Fire Brigade portion of the building is designed with a view to general convenience and a quick dispatch in case of fire.

The building will be carried out in red brick with stone dressings, and will be roofed with Westmoreland green slates.

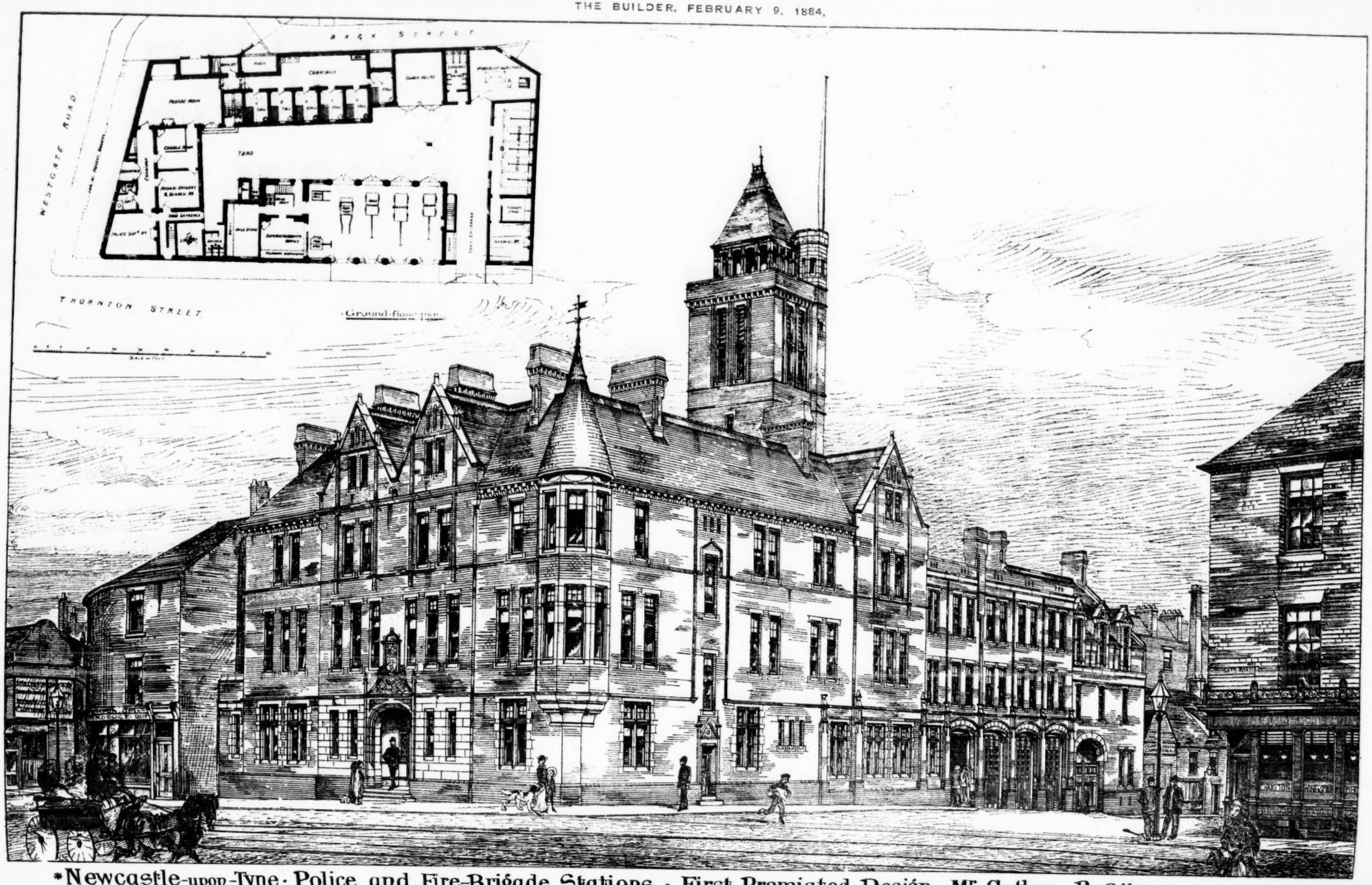
Mr. A. B. Gibson, the author of the design, has received instructions to complete the working drawings, and the building will be commenced in the early part of the year.

The other design which we illustrate was submitted under the motto "Ad Rem," and was selected for the second place, conjointly with that of Messrs. Clark & Moscrop, of Darlington. In the Fire Brigade Station, on the first-floor, are placed apartments for married and single firemen, baths, and lavatories. On the basement are the laundries for both departments, &c. The roof is an asphalted flat for drying the hose, above which rises the watch tower which is a feature somewhat necessitated b reason of the hose hoist.

In the police department, on the first floor, is the general mess-room and its adjuncts, billiard-room, library and sitting-room, and cleaning-room, with bed-rooms in the attics.

THE EASTER SEPULCHRE IN HECKINGTON CHURCH.

THIS Easter Sepulchre possesses special interest, apart from the comparative rarity of examples in England, in its great elaboration and unusual design. The artist seems to have purposely disjointed the architectural features of the upper part in order to emphasise the value of the long flowing lines in the foliage. The crockets and small grotesques are very similar to the carvings on the screen at Lincoln Cathedral, a likeness which the figure-sculpture does not possess.

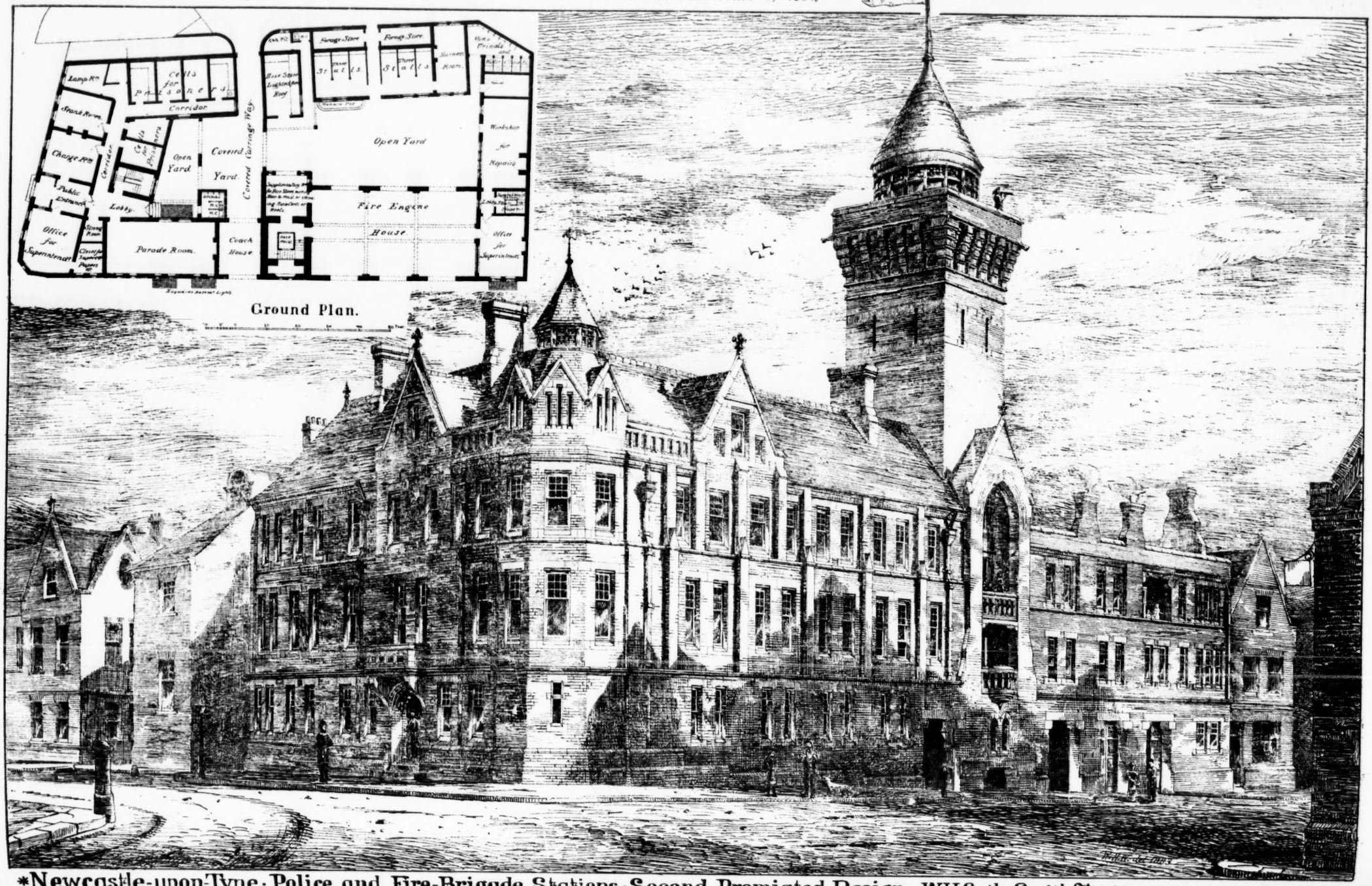


*Newcastle-upon-Tyne · Police and Fire-Brigade Stations · First Premiated Design · Mr Arthur B. Gibson · Architect *

Whiteman & Bass Photo-Litho

Wyman & Sons, Printers.

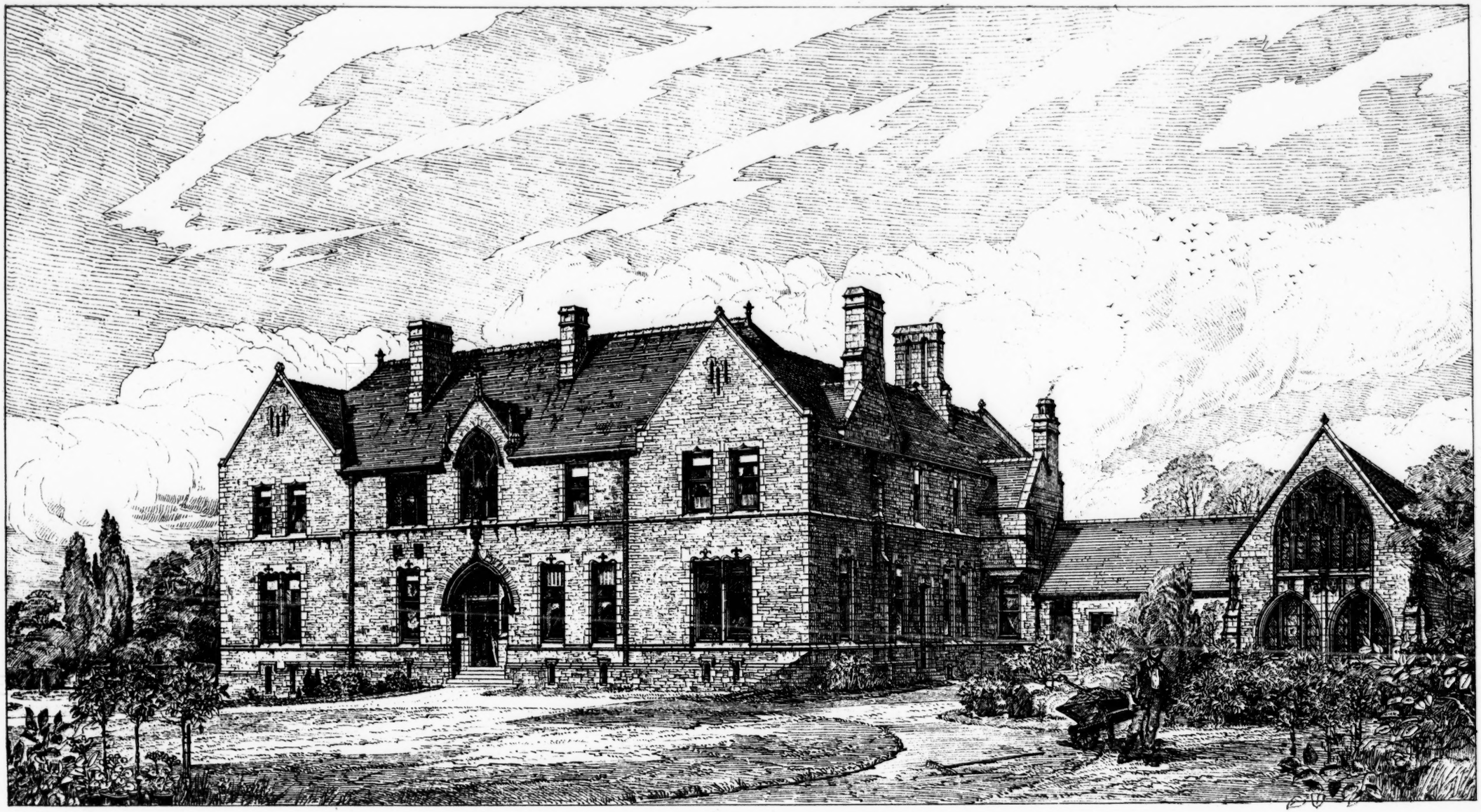
Ground Plan.



Newcastle-upon-Tyne·Police and Fire-Brigade Stations·Second Premiated Design· W.H.Seth-Smith.Archt·4·6 Lincoln's Inn Fields·1883.

Whiteman & Bass, Photo-Litho

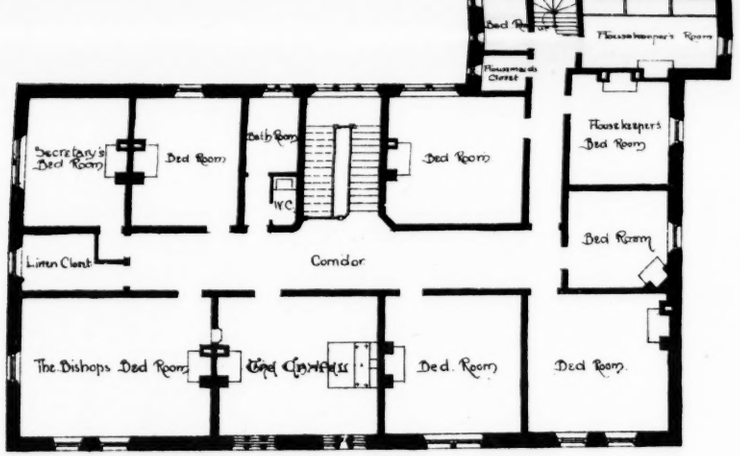
Wm. Lee & Sons, Printers.



House for The Rt Revd A. Riddell. D.D.

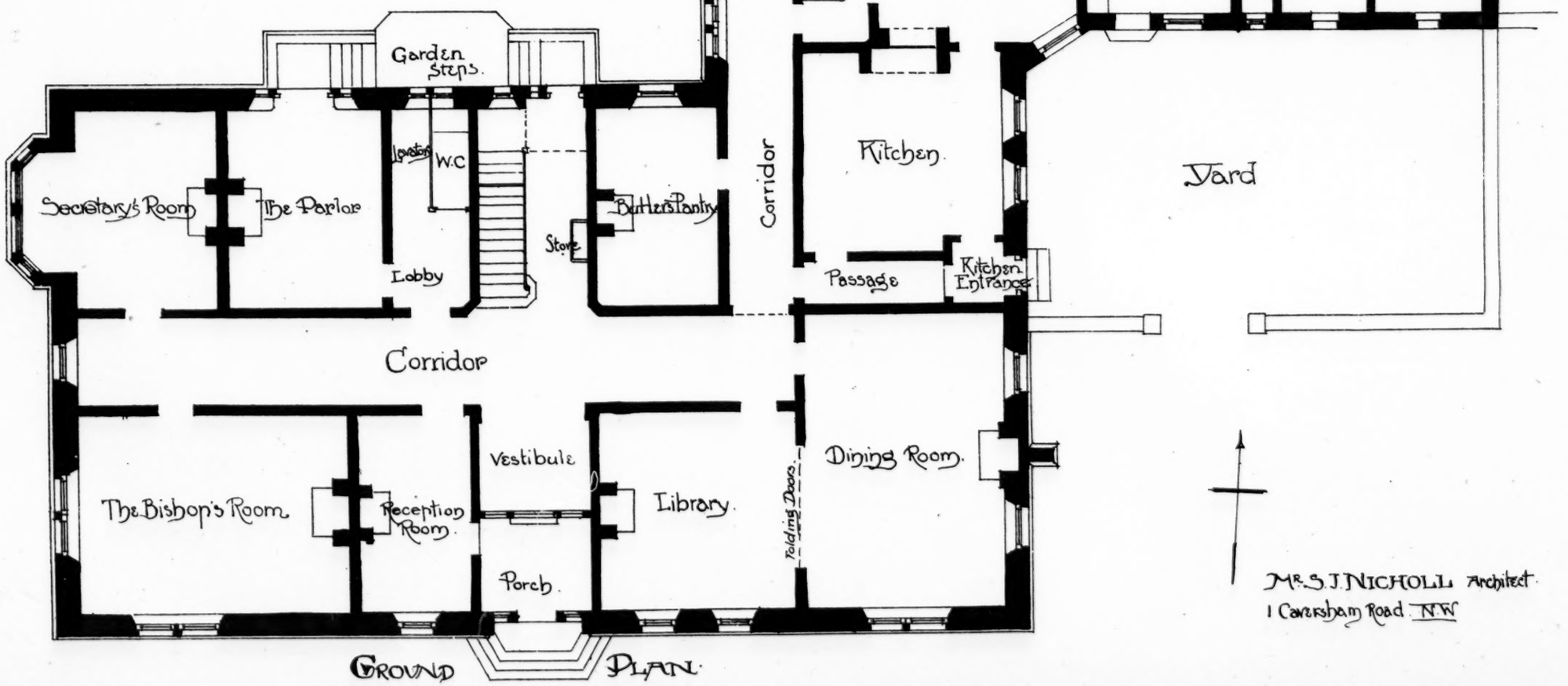
Roman Catholic Bishop of Northampton

Roman Catholic Bishop of Northampton



CHAMBER PLAN

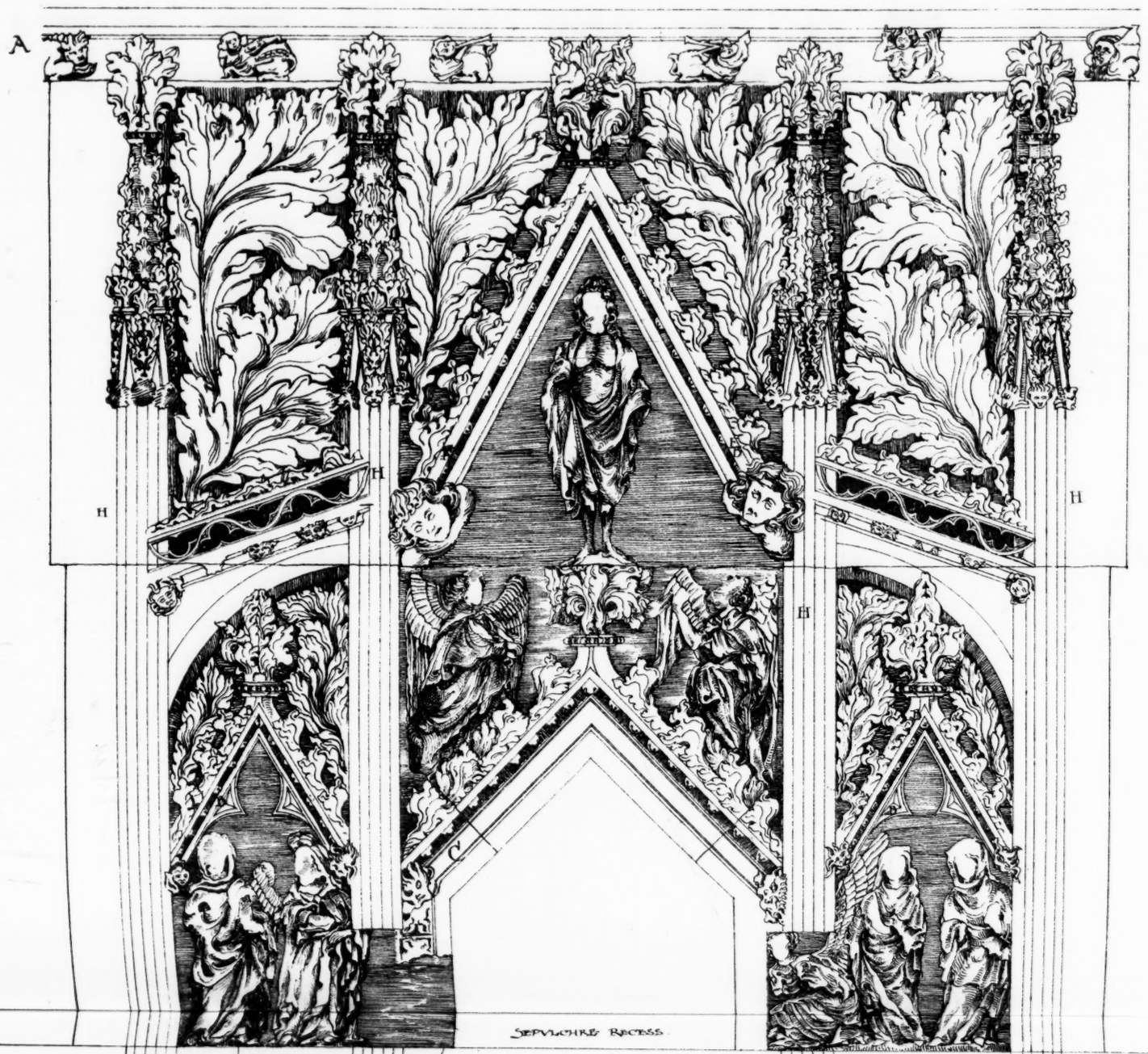
SCALE OF 10. 5. 0. 10. 20. 30. 40 FEET.

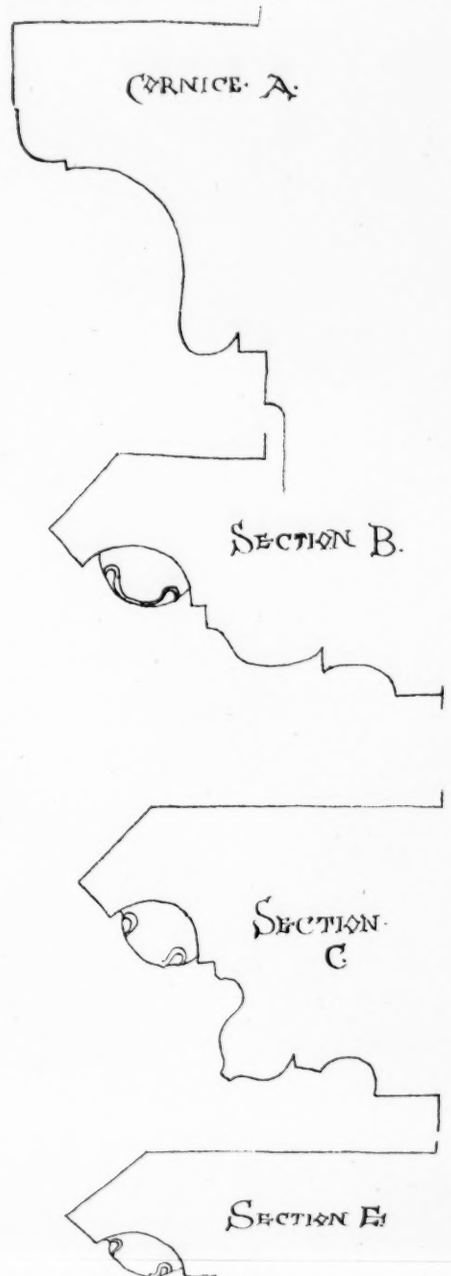


GROUND PLAN

MR. S. J. NICHOLL Architect
1 Caversham Road N.W

THE EASTER SEPVLCHRE IN HECKINGTON CHVRCH LINCOLNSR





SEPULCHRE RECESS

F F

G G G G

H H H H H

L L L

K K K K

SEPULCHRE

PLAN

Scale of Feet and Inches

Piscina on South wall of Chancel

NOTA. THE FIGURES OF THE WATCHING SOLDIERS ARE SADLY DEFACED AND KICKED ABOUT.

JOINT

CILL F.

JOINT

CORNICE G.

THE SECTION OF PINNACLES H.

SECTION I

K

BASES K.

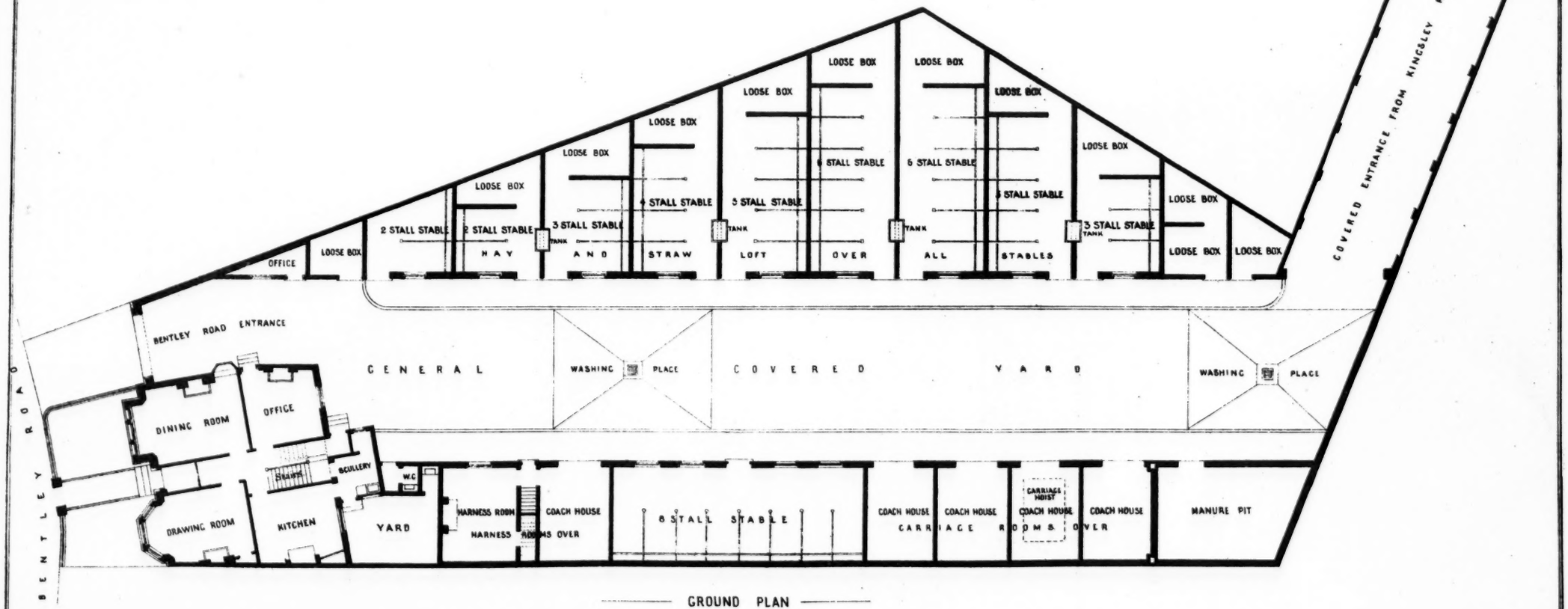
A. Beresford Pite, del.

C.F. Kell Photo-Lith. & Printer.

8. Castle St. Holborn London E.C.

SEFTON MEWS. PRINCE'S PARK. LIVERPOOL.

Mr JOHN WILSON PROPRIETOR.

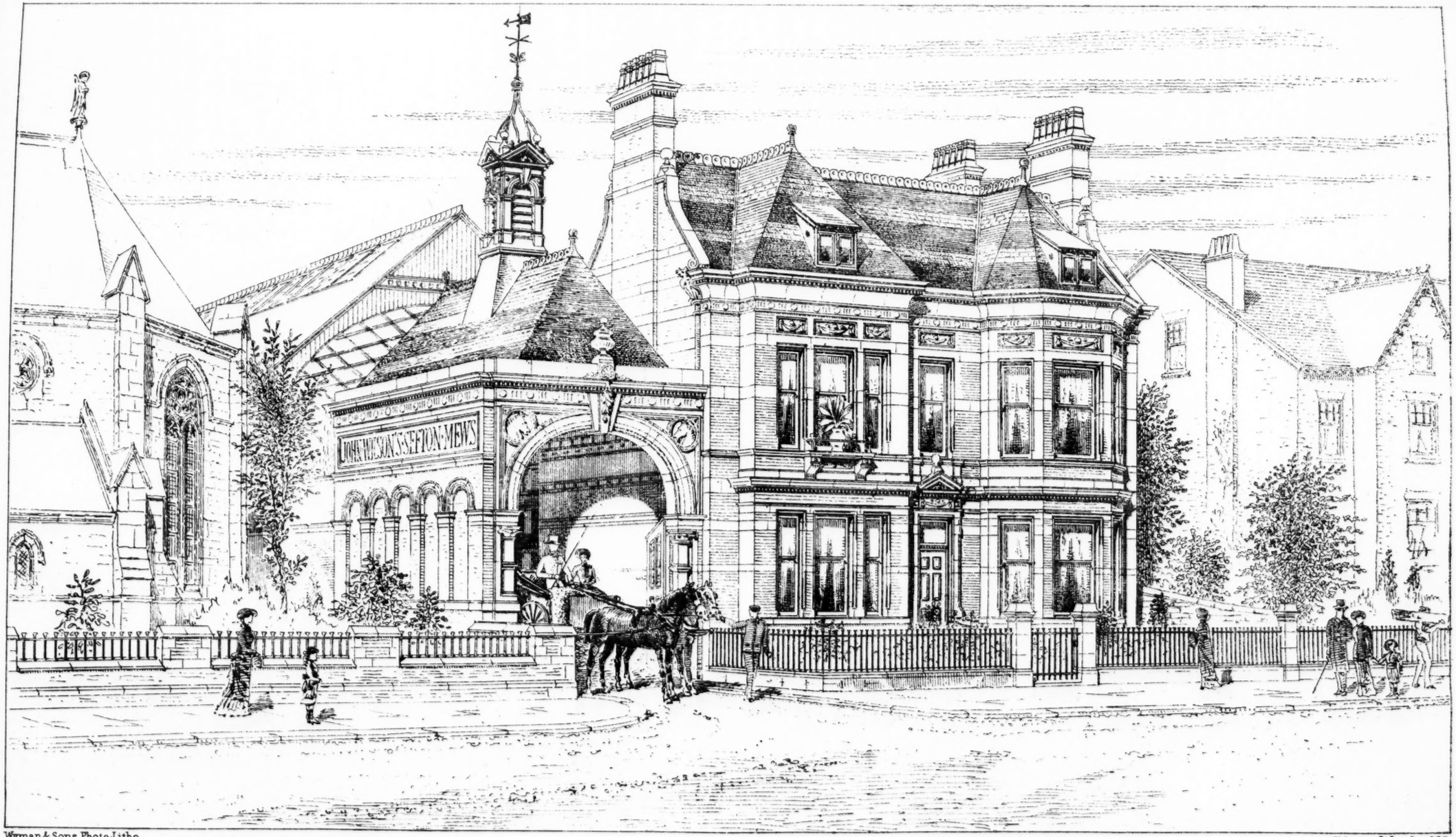


GROUND PLAN

SCALE OF FEET

John E. Reeve
Architect 23 Church Street
Liverpool

Wyman & Sons, Photo-Litho
Gt Queen St London, W.C.



Wyman & Sons, Photo-Litho.

Gt Queen St London, W.C.

SEFTON MEWS, PRINCE'S PARK, LIVERPOOL.—Mr. John E. Reeve, Architect.

THE BISHOP'S HOUSE, NORTHAMPTON.

THE house now in course of erection by the R.C. Bishop of Northampton, as a residence for himself and his successors, has been carefully designed upon lines laid down by the Bishop, after due consideration of the wants of the diocese. The site, which has been newly purchased, adjoins the Cathedral grounds. The house is so planned that the principal rooms face the south and west, and will be connected with the cathedral by a cloister and sacristy for the Bishop, shown in the view, but not yet commenced.

The rooms are spacious and lofty, the ground floor being 12 ft. 6 in. in clear height. The floor-line is raised well above the ground-line, and the whole area is provided with a basement, and covered with concrete as a security against damp. The walls are thick-faced with local stone, and lined with brickwork; the roof will be tiled; the corridors are to be paved with tiles, bedded on concrete arches, the whole construction being of the most solid and durable nature.

A general effect has been aimed at in the design which would be well in harmony with the cathedral and adjoining convent, but with a more domestic character. The chapel is marked on the exterior by a concentration of ornament, and the whole of the detail and fittings of the interior have been specially designed in the same spirit.

The general contractor is Mr. Robert Finnegan, of Northampton; the contractor for the masonry, Mr. F. G. Anstey; the clerk of the works, Mr. P. Shaw. The whole is being carried out from the designs and under the superintendence of the architect, Mr. S. J. Nicholl.

NEW STABLES, SEFTON PARK, LIVERPOOL.

ONE of the many petty worries of fashionable life is the administrative paraphernalia connected with "keeping a carriage." The bother of the horses periodically falling ill, each time on the very day you most especially wanted them; the anxiety of damaging the market value of the beasts by late hours in the cold and wet; the high jinks of an intemperate or dishonest coachman (recommended to you, doubtless, as an A 1 in the coachman world); the mysterious and expensive ways of forage-contractors, veterinary surgeons, and livery tailors, all make up a sum total of botheration and annoyance which hundreds of people have found quite past endurance.

This has led many gentlemen of average means to buy their own vehicles and have them horsed and attended to at livery-stables. The animals are guaranteed to be always in good health and at hand, the men likewise; and the yearly cost can well be, for obvious reasons, much under that of amateur horse-keeping, and yet yield a good profit to the stable-keeper.

What is, however, wanted in order to let the public have a fair trial of this less harassing and more economical way of keeping a carriage is for large livery establishments to be built in the various centres of fashion, specially designed for the particular work required. The experiment, we hear, is being tried in Liverpool on this scale by Mr. Wilson, a well-known horse-dealer of that town. He has erected for the purpose a building, of which we give this week an illustration of the ground-plan and a view of one of the elevations. It is situated in the Sefton Park district,—the Belgravia of Liverpool,—so the site is a good one for the undertaking. Some idea of the size of the structure may be gained by the fact that the floor-space covers over 4,000 square yards. The carriages are taken up on a lift to the first floor, and the conveniences for doing so are such that the vehicles will keep their smart newness much longer than they possibly could in any ordinary private town coach-house.

Full dressing-room accommodation has been provided for the staff of men who are going to supersede the troublesome "family coachman," and we understand that a firm of tailors in the town has contracted to supply, not simply a livery for each of them, but an assortment of liveries for gentlemen to choose from, so that each customer can have a distinct family one.

The stables are furnished, it is believed, with every fitting and modern improvement which has yet been brought out. Amongst these may be noticed the method of water supply. Between each stable, in the inside thereof, is an open tank, built half in the thickness of the wall, from which the men obtain water direct, without splashing or loss of time. These tanks are all served from a central one. By the arrangement the water reaches the horses at an average level temperature throughout the year, which is a most desirable thing to secure.

The buildings were designed by Mr. John Elliott Reeve, architect, of Liverpool, and the entire work has been recently carried out under his superintendence.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE seventh ordinary meeting of this Institute for the present session took place on Monday evening last, Mr. Horace Jones, the president, in the chair.

The late Mr. J. H. Parker.—Mr. Macvicar Anderson (hon. secretary) said that since they had last met a well-known name had been removed by death from their list of members. It was not customary, nor was it his desire, to enter into any particulars or details, but it would not be seemly if a man so well known as John Henry Parker were to be allowed to pass away with merely the usual official obituary announcement. Mr. Parker was born in 1806, and succeeded to the business of his father as bookseller and publisher in Oxford. In 1836 he published a book known to all students of architecture,—the "Glossary" of English Architecture,—which showed a vast amount of industry and research. This was succeeded by many other works in subsequent years. Mr. Parker at the time of his death was President of the Architectural Society of Oxford, Vice-president to the English and American Archæological Society of Rome, and was one of the very few Honorary Members of the Institute. Thus had closed the career of one who, in his day and generation, had done much good for the increase of knowledge in connexion with architecture and art. It was with great regret that he had to announce the decease of Mr. Parker.

Pugin Travelling Studentship.—The Chairman announced that the Pugin Travelling Studentship had been awarded to Mr. Joseph Gibbons Sankey, 36, Maitland Park, Haverstock-hill, there having been seven candidates.

The Godwin Bursary.—It was also announced that the Godwin Bursary had been competed for by 36 candidates, and had fallen to Mr. Frederick Richard Farrell, 32, Craven-street, Strand.

This Year's Royal Gold Medallist.—The Chairman said that the Council proposed to submit the name of Mr. Wm. Butterfield, architect of All Saints', Margaret-street; of Keble College, Oxford, and various other colleges and domestic buildings, to her Majesty the Queen, as the recipient of the Royal Gold Medal for the current year. While honour would be conferred upon Mr. Butterfield in receiving the medal, he would also confer honour upon it, and upon the Institute, by accepting it. [The announcement was received with much applause.]

REVIEW OF THE EDUCATION AND POSITION OF ARCHITECTS IN FRANCE SINCE THE YEAR 1671.

Mr. William H. White, Secretary of the Institute, then read a paper bearing the above title. He said that although much had been done to establish academies in France before Jean-Baptiste Colbert became Minister of State, he was still considered to be the founder of the academical system, which had passed scatheless through periods of monarchical disorder, general confusion, and revolutionary tumult, which had been overturned for a time, set up again by the nation, consolidated by successive reforms, and recently developed by wise and generous measures. The French Academy was instituted in 1635 under Cardinal Richelieu, but to Colbert was due the Academy of Inscriptions and Science, and he first established the Academy of Architecture. In 1661 the French king ordered that prizes should be given to those who succeeded best, promising that a certain number of young men should be sent to Rome at the royal cost, and who, on their return, should be employed upon the royal buildings. At the same time he commanded that through the means of public lectures the sciences necessary to the study of architecture should be taught, and what these were must be learned from an examination of Blondel's course of lectures. When they remembered the state of French and English society in the latter end of the seventeenth century, and what was the condition of the great mass of mankind in the different countries of Europe, it was impossible to regard the literary performances of Blondel, Perrault, Félibien, and others, with other than sentiments of admiration and humility. The acknowledged excellence of many of the public buildings, executed throughout France during the seventeenth and eighteenth centuries was largely due to the influence of the Academy of Architecture, and to the wise control exercised by successive Ministers of State. Nowhere was this better shown than in the orders to Perrault to report, amongst other things, upon the quality of the stones used in the churches of Paris and its environs. So thoroughly had this been done, that M. Viollet le Duc had stated that time had only confirmed the observations made in the Academician's report. Mr. White next referred to the charters of the Royal Academy of Architecture in 1717 and 1776. A generation of *rococo* had come and gone when Voltaire wrote his famous letter, "Des Embellishments de Paris," in 1749. Nevertheless, the architects were neither unskilful nor inactive, though the style might be burdened by misplaced ornament, and the Academy was producing no better adaptation of ancient architecture than it had hitherto done. It was recorded that in St. Petersburg, Berlin, and other places, the principal architect was then a Frenchman. The fresh lease of the patent presented to the Academy in 1775 declared that it should be composed of Academicians who were architects, of Associates who should be non-professional, and of Correspondents or Associates who should be both native and foreign. The Academicians were divided into two classes, each of sixteen members, the Hon. Associates to be sixteen, chosen from persons who, without professing architecture, were distinguished by their knowledge of it or the allied arts, and a rank was allotted to them between the first and second classes of Academicians. The Revolution, which suppressed all academies, served to restore the development of French supremacy in the arts. On the 23rd of August, 1795, the National Institute of France was founded by a decree of the Republic. It was to be composed of 144 members residing in Paris, and the same number of Associates scattered over the provinces. In 1816 the École des Beaux-Arts was organised. Each academy was allowed independent action and free disposal of its grants. Since then the Institute of France had consisted of five academies, one of which was the Academy of Fine Arts, which was composed of fourteen painters, eight sculptors, eight architects, four engravers, with ten important Academicians, ten foreign Associates, and a corresponding Secretary. In course of time the Government, recognising the necessity of possessing some central institute in which architecture could be taught, set apart certain rooms in the Collège des Quatre Nations. The École des Beaux-Arts may be said to date its existence from the beginning of this century, when the present buildings were commenced. The Ordinance of Louis XVIII., which determined the rules of the new school, divided the section of Architecture into two classes, leaving the direction of the school in the hands of the Academy of Fine Arts. This lasted until 1863, when a decree of Napoleon III. virtually separated the school from the Academy, setting up the former as an independent institution under the immediate control of the State. The adjudication of the Grand Prix de Rome was taken out of the hands of the Academy, and had to be decided by nine members for painting, nine for sculpture, nine for architecture, five for plate-engraving, and five for engraving of medals and gems. Mr. White next quoted the rules of the schools. The section of architecture was divided into two classes, without a limit being put on the number of students. A diploma was granted by the school, and for the Grand Prize of Rome only Frenchmen were allowed to compete. The conditions were very simple. In March of every year a preliminary trial took place, the candidates having to make a sketch in twelve hours. From the best of these sketchers the jury selected twenty-five, who had to undergo a second ordeal, consisting in making another sketch in twenty-four hours. From these last ten were chosen, entering *en loge* for several days. Three candidates were

then premiated, the first obtaining a gold medal and leaving early in the following year for the Academy at Rome, while the other two also gained medals. At Rome the student had a bed-room and private studio allotted to him. He was compelled to conform to the rules of the Academy, and to submit to the orders of the director, but so long as he fulfilled his obligations in the matter of drawings, little restraint was put upon his actions. On the return of the student from Rome he got professional employment in some of the public buildings in course of construction. Mr. White continued that he had been describing a system of organisation totally foreign to this country. It might be said that the Great Prize of Rome could be gained by only a few men, and that it was in most cases a chimera to those who competed for it. Yet the pursuit of this chimera kept 500 students on the benches of the schools for ten years, and those who did not succeed in gaining the Grand Prix found themselves good painters, good sculptors, and good architects. The student at Rome also made what our grandfathers called the "Grand Tour," and brought back in his portfolio not mere bright-coloured sketches, but genuine architectural drawings, such as delighted the English masters of an earlier day. The advantages of the system were patent, and the magnificent results could be judged by a study of the national edifices of eminence in France. Many people in France, and a much greater number in this country, were satisfied that state-supported academies and schools were mere derelicts of Protection: but, to his mind, the difference between a body of architects under the Academy system which had flourished in Paris, and those left to pick up knowledge in a speculative scramble for employment, was not unlike the difference between an army of soldiers fit to take the field, and a scratch gathering of men with muskets. If any plea were needed at the present time in favour of English architects possessing early in life a scholarly acquaintance with the French tongue, it might be found in the existence of the splendid literature which during the last 250 years had helped to raise France to artistic eminence; and it might be found in the pleasure and profit to be derived from the true appreciation of the fine understanding, the polite consideration, the charm of manner, with which men of science and letters in that country treated the noble subject of architecture. On the other hand, if anything could add to the depression which a reference to architecture occasioned amongst similar kinds of people in England, it might be found in the avowed opinions of many eminent men, successful in their own walks of life. In France each Academy in turn presided over the whole Institute, M. Gounod, the composer, being president last year. Men of science and art occupied a position in France to which there was nothing comparable in this country. This had grown out of the system which had prevailed for two centuries, by which the monuments of Greece and Rome had been brought to the knowledge of Frenchmen, and had conferred upon them an inheritance which enabled the little Republic to divide with Imperial Rome the homage of the modern world.

The Chairman, in inviting discussion, said that the paper they had heard was a charming, complete, and comprehensive essay. Embodying as it did so much in so small a space, it would afford the members plenty of room for thought and consideration.

Mr. R. Phené Spiers considered it would be valuable to go slightly more into detail as to the operations of the French Academy, in which he had studied in France,—with regard more especially to the peculiar system organised there for the teaching of students in architecture. Mr. White had, perhaps, not drawn sufficient attention to the question of the free *ateliers*. Mention had been made of certain free *ateliers* which had been started probably with the cognisance of the schools. The students in many cases clubbed together and appointed a *patron* of their own. The *patron* of the *atelier* to which he belonged succeeded to another, and other *ateliers* were formed, and in 1863 there must have been as many as twenty. These had no recognition in the school except that students were allowed to add to their names at the bottom of their drawings "Pupil of M. So-and-So." Every student was permitted to study where he liked, but in making out a complete design the student had to attend *en loge*, and in the course of twelve hours to complete the design, taking a tracing to work out in the *atelier* of his patron, and to obtain his advice on the various modifications. At the same time he was not permitted to depart from the design in any material way. At first sight of a large studio with 150 students, it might seem impossible for busy men to give the time to the students which would be necessary; but that was not required in the French *atelier*. As there were many men who might not obtain the prize of Rome without studying for ten or more years, there were always in each *atelier* a number of men of different stages of power. The Professor gave his time only to the seniors, while the seniors gave advice to the juniors, so that there was an accumulated mass of advice. Each man was in friendly rivalry with his brother students, and each *atelier* was in rivalry with the others, and therefore they all worked together to raise the character of the designs. It was impossible to describe the extraordinary effect of this system of emulation, and no possible mastership in a school could produce such results in so short a time. This year for the first time there had been a competition at our own Royal Academy, somewhat similar to those in the French schools,—the painters, sculptors, and architects competing together for a design for a wall painting; and although the painters were at present too strong for them, he was not without hopes that the prize would occasionally be wrested from the painters by the architect students. One of the great difficulties they experienced in their offices in this country was the absolute ignorance of drawing in the case of the young men at first, but in France this was not so. Almost every young man studied drawing, and in every province there were schools of drawing formed at the expense of the Government, and it was certain that some of the evenings of the student would have been spent there in gaining preliminary knowledge. The result of carrying on the school from the time of Blondel was that the tradition of the designs had been kept up,—that tradition which in England was stopped by the death of any of the great masters. Men studied up to the age of thirty, went to Rome, and came back at thirty-five with scarcely any idea of construction beyond the broadest principles, and without any economical knowledge of material. But the Government recognised that the man who had sacrificed so much of his time to the fine arts had a great claim on the assistance of the State, so that he was invariably appointed to some public place where there were clerks of works or building inspectors from whom to pick up his practical knowledge. Mr. Spiers concluded by proposing a vote of thanks to Mr. White for his excellent paper.

Mr. Arthur Cates referred to the recent introduction of the examination for the *Diplome d'Architecte*. This was a point of great value, and one to which this Institute might well address itself. He hoped when Mr. White's paper was published he would give in the appendix some details of this examination. As long ago as 1854-5 the Architectural Association was much agitated upon this question of the diploma of an architect, the members being then willing to submit to an examination in order to obtain some sort of certificate as to their professional merits and attainments. At that time M. Adolph Lance had published several articles on the subject, and in 1855 Mr. Tite, then president of the Institute, expressed his sympathy with the views of the Association, saying that the members seemed to feel the need of some diploma, as a recognition of their attainments. Mr. Cates then quoted from M. Lance, according to whom it appeared that even in France, as soon as a mason knew how to draw he gave himself out as an "architect." M. Lance repelled most decidedly every proposition which would tend to establish a distinction between the man who was called the purely artistic architect and the architect who was the constructor, and affirming that there was only one architect. The step which the École had taken with regard to the examination for a diploma was one which interested this Institute greatly, because within the last two or three years, after a struggle extending over twenty-seven years, they had listened to the memorial of the Architectural Association, and had established, first, a Voluntary, and now an Obligatory Examination for Associates of the Institute. It had been said, with some scorn, that it was a "mere surveyor's examination"; but there was not a single item in the whole curriculum which it was not necessary for the architect to be familiar with. He only regretted it was not far more extended, following the lines which were now laid down by the École des Beaux-Arts. Mr. Cates seconded the vote of thanks to Mr. White.

Mr. E. C. Robins said he had lately visited Germany, where he found architecture taught most effectively. There were professors of it, from the fine-art and practical points of view, in every college and technical school, and the drawings he inspected struck him as being of great excellence. Every drawing prepared by the students showed the treatment of the constructional portions, the calculation of the strengths of the materials being put as an appendix at the bottom of the drawing. The result of all this was most satisfactory.

Professor Kerr said he would like to move the adjournment of the discussion. A very important national question had been raised, and they had before them two great points, viz., whether in this country something could not be done to advance their organisation as an artistic profession; and, secondly, whether the time had not arrived when they should take a new step in a fresh direction as regards the conditions of an architect.

Colonel Lenox-Prendergast, Hon. Associate, seconded the motion for the adjournment of the discussion, which was carried.

The vote of thanks to Mr. White was then passed, and the proceedings terminated.

THE SANITATION AND RECONSTRUCTION OF CENTRAL LONDON.

THIS was the subject of a paper read before the Society of Arts on Wednesday evening last by Mr. William Westgarth. Commencing by referring to the insanitary condition and rapid growth of the metropolis, and to the congested state of the central parts, he traced the "chance-medley" process by which its irregular streets were evolved, and argued that, although the London death-rate had been materially reduced of late years by the improvement of the sewerage and other means, better things even in this respect were to be hoped for. Coming to the subject of "Central London as it ought to be," Mr. Westgarth continued:—

I must content myself with very general remarks on this part of my subject; for, although it may be called the most important of all, as embodying the final outcome of result, it is much too technical in character for any closer treatment at my hands. I speak, however, as a London citizen of long standing, who aims to rise to an adequate idea of all the greatness of his adopted city, and who has been long impressed, and each succeeding year more and more strongly, that its accommodations and its general aspect fall utterly short of the needs of its millions of people, and of its surpassing position in the wealth and commerce of the world.

I have spoken of the hap-hazard direction of our original City thoroughfares. In this comparatively limited area, with which our project has more especially to do, two chief centres stand out before us. The lesser of the two, comprising the site of St. Paul's, I would distinguish as the art centre; the greater being, of course, that great centre of the world's commerce and finance which is now indicated as the fertile site of our Royal Exchange and Stock Exchange, of Lloyd's, of the Bank of England, other chief banks, and "Lombard-street," of the Mansion-house, and of the City Branch of the General Post-office, with the ever-increasing marvels of its vast business. Is it too much for London to claim that these two chief centres should be connected by the grandest of streets, not merely of London, but of the world? From these centres, but especially from this latter business centre, should radiate all the chief thoroughfares of London. Sir Christopher Wren, and others after him, have in vain draughted plans for a reconstructed London. The Great Fire of two centuries ago might have given a fitting opportunity, but it was not availed of. To-day, in attempting the work, we would not have quite the same freedom of the ideal, for there are not only the many river bridges to be considered, but well-nigh a host of great railway stations penetrating and

permeating London. The plan of a reconstituted London of to-day must be, therefore, an artisto-economic contest mainly with reference to those bridges and stations.

But let me return for a moment to the great business centre. When our noble St. Paul's has been "unstifled," by concession of some little more of surrounding breathing-room, when we have the finest of streets running from the noble cathedral to that other centre, what ought we to aspire to as worthy of the latter? Our climate is suggestive of the comfort and convenience, to say nothing of modern possibilities of elegance, of the arcade form of edifice. Repeatedly, as I stood under the beautiful new structure of this kind in central Milan,—constructed, too, as I was told, by English enterprise and capital,—I have asked why London should be so contemptibly inferior in that way. If we, then, are also to have a central arcade, let us hope that it is to excel in magnificence even that of Milan by as much as London excels, in population, wealth, and commerce, her fair rival of Northern Italy.

But I have yet another idea with regard to London's grand business centre. It is already, as we have seen, the common meeting-ground of many of our leading city interests. I would complete, as far as might be, this central representative character, by providing accommodation for every kind of institution with which the public were largely or frequently concerned. There would not, of course, be full accommodation for all, but all might "enter an appearance," and the modern facilities of telegraph, telephone, &c., would do the rest. I do not limit this idea to public institutions, such as Parliament, the various Government offices, the legal and judicial, the postal, the customs and excise, and so on. The chief trading interests might be there also, including even hotels, theatres, &c. The railways also, of course, must enter their appearance here, and perhaps adequate subterranean accommodation might permit of a convergence of all the lines to this great centre.

When we have once experienced the incredible business facilities of this centralising officiate system, we shall look back with amazement upon our present utterly unsystematic site-scattering of all these public and business interests, and the time and trouble which are thus involved to everybody. Indeed, I have long entertained the still larger idea, in the interests of economies and conveniences of every kind, of bringing together all the chief public offices into one great commodious common edifice. No central site is now possible for so comprehensive a structure, but a near suburban site might still be found, and a special railway service at nominal charges might bring these collective offices, as a whole, much nearer to every citizen than at present. Of course, any hope for this very disturbing idea arises out of a reconstructing of London.

I must now hasten through some other chief considerations of a reconstructed Central London. As we are to indulge in unprecedented width of our chief streets, we may recompense the sacrifice of accommodations in one direction by seizing upon more of them in another; that is to say, by giving a greater height to our new buildings. We have plenty of room both towards heaven above, and in the earth beneath, and the modern facility of perpetually-going lifts will almost abolish wearisome staircases. Let us begin with our subterranean. We must eject all the old poisoned soil, and, in so doing, institute a new level of construction. An ample subterranean will give us at once business storage, and the due facility for availing of all the progress of art and science in the future, in our lighting, watering, sewerage, and the application of energy or power in all ways, without the heretofore incessant breaking up, over and over again, of our streets.

Next, we have a lofty ground-floor,—so lofty as to allow, without serious reduction of light to that floor, a terrace or upper promenade, with bridged connexions for foot passengers, so as to put an end to those countless street dangers and accidents which already cost to London and its suburbs the yearly sacrifice of 270 lives. This level, as well as that of the ground, will have its shops and traffic, to swell out a remunerative rent-roll.

We continue our ascent through successive floors of offices or dwellings, until the public lift lands us, without fatigue, upon the roof. Here is something entirely new to London experience, and possibly to any other as yet, but entirely attainable under a systematic reconstruction. In short, the roofage of our chief streets is a public promenade, a continuous park or garden. The original idea in this grateful direction is due, I believe, to Dr. Richardson, who, in removing the too savoury kitchen from the very bottom of the house to the very top, would have the house surmounted by a garden. The chief or only obstacle in the way of such enjoyments is the difficulty of dislodging the ordinary Englishman from his accustomed groove of comparative discomfort. In this time of scientific promise and attainment, we may venture to prohibit smoke entirely to the new city. The sanitary conditions will thus combine with the scenic to give us, with these "hanging gardens" of the modern Babylon, a new era of health and enjoyment for its crowd of citizens.

The project we are now discussing involves the turn over of probably not less than one hundred millions of money. How is all that money to be duly found, and how is the great work, with all this great cost, to be remuneratively executed? This may seem, at first thought, the most difficult section of the whole project. But after much consideration of the subject, based on large business experience, I feel myself on surer ground and more at home in this section of my project, than in the somewhat technical bearings of the other sections, to which I have already alluded.

The great difficulty hitherto in the way of the much-needed clearing and improving of the congested centres of our larger towns has been the terrible amount of the unrecouped balance of the cost. The famous Paris reconstruction has certainly given a most enviable result, so far as regards improvement, but it has been at the cost of a very onerous heritage of City debt. In proposing, as I now do, to execute all the reconstruction of Central London without any such undesirable heritage, and even without appeal to the State for any pecuniary help whatever, I must explain how very differently we are to conduct the proposed work from the methods adopted in Paris and elsewhere, and even in London itself, so far as reconstruction has yet proceeded.

A chief factor in the great recoupment question is what economists have termed the "unearned" increment of site value,—of the value generally of our real estate,—due to the simple effluxion of time in any progressive society occupying a limited site area. The theory which underlies this increment is neither uncertain nor unintelligible, but until quite recently it was left all but entirely to the theories of economists, and anything approaching a practical application of its principle was hardly dreamed of. The past experience of the advance of London site values and rentals, and more especially of those of the central areas of the City, indicates clearly to us now that the cost of a great reconstruction scheme, such as that here proposed, would have been entirely recouped within any thirty years of the past of this century. I mean that if, for instance, in the year 1854, such a great project of reconstruction as I now suggest had been actually undertaken, the present enhanced values of the expropriations, had these been held over until now, would have recouped the whole cost after the fullest compensation at the time to all the expropriated parties. The practical question for us is as to this "unearned" increment of value, or as I would less invidiously call it, this natural increment, continuing to be a feature of the future as of the past. We can hardly doubt that this will be the case, seeing that the causes to which it is assignable are still in as full force as ever; namely, the increase of commerce, wealth, and population, upon a site area which is itself inextensible.

We are to bear in mind, however, with regard to this said future increment, that the more it is explained and generally understood, the more will the effect be to convert future value, by intelligent speculative anticipation, into present value. But, on the other hand, there will always still remain a substantial future increment, both because the calculation must ever be wanting in elements of precision, at least, as regards any particular cases of site investment, and because present values and rentals will always depend more upon the present scale and returns of business, than upon any speculative estimate as to what these may possibly attain in the next generation. And, again, behind this prospect of recouping increment, we have in store all the additional value of a resanitated London, a value which, in its heretofore unknown quantity and power, may possibly prove the most secure and effective factor of all.

ARCHITECTURAL ASSOCIATION.

AT the ordinary meeting of this Association, held on Friday, the 1st inst. Mr. Cole A. Adams, president, occupied the chair.

The Hon. Sec., Mr. Appleton, announced that the next Saturday afternoon visit of the members of the Association to works in progress would take place to-morrow (the 9th) to some new houses in Harrington-gardens, designed by Messrs. Ernest George & Peto.

The Chairman referred in feeling terms to the death of Mr. John Henry Parker, the eminent archæologist. He said Mr. Parker had been a friend to all the leaders of the Gothic revival, and his name would live long in the memory of all students.

Mr. J. D. Crace then read a paper on "Colour Decoration," the first part of which we print on another page.

In the discussion which ensued,

The Chairman said Mr. Crace spoke from the valuable stand-point of experience, and was a man who had distinguished himself in the profession which he adorned. He was exceedingly glad to hear Mr. Crace lay so much stress on the decoration of ceilings. He had found amongst those who had not devoted much attention to the study of decoration that the invariable idea amongst people was that to decorate a ceiling was to bring it down on one's head. There was a great deal of truth in the remark that decoration in art must be founded on the uncommon sense of common sense, and they must treat the decoration as they would build a house. A previous paper had raised a discussion on "swags," or curved sprays of foliage on flat surfaces, and he would like to hear Mr. Crace's views on that point. He ventured to differ a little with Mr. Crace on the question of gilding. He believed that gold, as a precious metal, could be employed sparingly and yet produce a brilliancy which was perfectly legitimate. He entirely agreed with Mr. Crace in his remarks upon mosaics. His own feeling had been often one of disappointment at the effect produced by mosaics when used in reredoses and other places. Mr. Street had said in a paper read before the Institute that mosaics should be used on a large scale, and on curved surfaces at a distance from the eye.

Mr. Stannus complimented Mr. Crace on his able paper. Referring to the matter of the festoons or swags, he ventured to think they were allowable, especially when they were near the margin of the ceiling. Mr. Crace had laid stress on the fact that he wished to give height to the centre by emphasising the margin. The result would be to suggest that the ceiling went slightly up, and then curved round in the form of a barrel vault. In fanciful decoration, such as specimens in the Pompeian and Roman manner, they would be allowed to use the swag festoons. They would not expect him to go into the question of cupola decoration, for obvious reasons; but he was glad to hear Mr. Crace lay down rules on that point with which he entirely agreed. He would query very much whether it was desirable to decorate staircases so much as to call attention to them, especially when he considered the number of accidents that happened in going up and down stairs. Mr. Crace had put the matter well when he spoke of reserving the decoration for the landings. The Association was much indebted to a man like Mr. Crace for coming and giving them the benefit of his experience and observations, and he had therefore much pleasure in proposing a vote of thanks to him.

Mr. A. B. Pite remarked that colour was a study well worthy of the attention of architects, and it was a subject free from the control of District Surveyors and the Board of Works. They were in the realm of artistic elements when dealing with colour, and the right way to study it was not in its relation to bare architecture, but rather to learn from nature. It was not necessary, in doing this, even to travel to Switzerland, for wonderful lessons in colour could be learned even in London, as, for instance, from the late magnificent sunsets. Colouring in nature showed an entire disregard for form.* They would observe this in the case of the parrot, the bird of Paradise, and the quagga, which latter was coloured without regard for

* Mr. Pite had better study nature a little more carefully, and reconsider his statements.—ED.

regularity of form. Colour was given in nature so that we might enjoy it for itself and not for the forms with which it was associated.

Mr. J. G. Crace, who was called upon to speak, said he had little to say, because his son and he were both of one mind; but the gentleman who had last spoken had raised a spirit within him which compelled him to make a few remarks. He admired what Mr. Pite had said, because it showed an independent mind, for it required considerable spirit to say that they should use colour independently of form. He disagreed with Mr. Pite, because colour could not be well applied if it did not in some degree harmonise with the forms which it sought to delineate and emphasise. In this country we neglected too much the use of colour. Every ceiling might be vastly improved in grace and wealth of tone and form by the proper application of coloured ornament, suitable to the size of the room. But the one should be applied in harmony with the other, and art, as applied to decoration, would add very much to the appearance, comfort, and brilliancy of the houses of the present day.

Mr. Millard had come all the way from Liverpool to hear Mr. Crace's paper, which he considered excellent and really beyond all criticism.

Mr. H. W. Pratt thought that those who had listened carefully to Mr. Crace would carry away the idea that they could help the decorator very much in his art if they designed their buildings with an eye to their decoration. He had not quite gathered whether Mr. Crace considered it advisable in domestic art that the ceilings should be treated with mouldings, or panelled in some way. He seemed to convey the idea that no ceiling could be satisfactorily treated in a small space if it were flat without any relief at all. As a rule, when the decorator was called in, and there was no shape or form of moulding in the ceiling, he was seldom expected to put anything in that way. Mr. Crace did not say how he would treat the mouldings.

Mr. Appleton thought that it was a mistake to attempt to give a reason for what we liked in colouring, although, at the same time, it was necessary to have certain rules. He believed that in regard to colour, what was one man's meat would be another man's poison.

The Chairman then put the resolution, which was carried by acclamation.

Mr. Crace, in reply, expressed his thanks for the compliment which had been paid him. The first point raised had been as to the use of festoons or swags on ceilings. The point of view from which Mr. Stannus had treated it was correct, if qualified to this extent, that in some cases there was almost an impression of a slightly curved ceiling. All ceilings as they receded from one appeared to have the edge which was furthest away lower than the centre, unless they were badly treated, and for that reason it was necessary to have the direction of any design precisely opposite to what it would be if designed for a carpet. In putting a monogram into the border of a carpet, the bottom of the letters must be towards one; while if the same thing were done in the edge of a ceiling, it could not be done, for the reason that the top edges of the letters must be towards the centre of the ceiling. The edge of the ceiling farthest from one was for all artistic purposes the lower edge, and in that sense the use of festoons had its justification. In regard to the amount of decoration on the staircase, as a rule, the average London staircase was a most disheartening thing to decorate, and the only thing to be done was not to make it worse than before. If it could be relieved a little, and an appearance of width given without absolutely ornamenting it, this was probably the best that could be done. Mr. Pite had said that in nature all colour was disregardful of form, but he (the speaker) could not read nature in the same way. The forms of nature and of architecture were essentially different, and if they took the case of the quagga they would find the alternation of yellow and black distributed systematically in opposition to the direction of the limbs or the length of the body. Those limbs were not like columns or arches; they did not represent mere stability, but were moving things. And inasmuch as the surface on which the colouring was distributed did not continue in the same shape, the colour was not applied in geometrical forms, which would be unsuitable, but in such a way that the alteration of the surface did not matter. The distribution of colour in the quagga showed, therefore, that nature was by no means disregardful of form. In buildings there was an opposite set of conditions, as their elements gave the impression of immovable stability. A small ceiling would be better left without division than a large one. In the latter case it was necessary to supply the place of mouldings by some equivalent lines or divisions.

THE INSTITUTION OF CIVIL ENGINEERS.

At the ordinary meeting on Tuesday, the 5th of February, Sir J. W. Bazalgette, C.B., president, in the chair, the paper read was on "Speed on Canals," by Mr. Francis Roubiliac Conder, M.Inst.C.E.

The important question of the resistance to the movement of vessels due to the size and form of channel, or to the depth of open water, through which they passed, was one as yet but little studied. It was only about seven years since the researches of the late Mr. W. Froude threw an entirely new light on the relations existing between speed and the proportions of vessels. A similar study was desirable as to the relations between speed, and area and form of waterway. It was known that a great loss of speed occurred when a steam-vessel passed from open water into a more or less restricted channel. Instances of this had been given in the Proceedings of the Institution It was also known that a sudden and remarkable increase of speed accompanied the passage of a boat over an increased depth of water, even if it were a mere ballast-hole in the bed of a river or canal. But neither the ratio nor the mechanical cause of this phenomenon had been clearly ascertained by hydraulic writers. In the most important inland navigation of the day, that of the Suez Canal, the low speed attained in the transit was one of the causes of the dissatisfaction felt by the commercial world, and the very small capacity of the canal for transport was painfully evident. The average speed at which vessels passed through the Suez Canal in 1882 was a little under two miles per hour; and if the speed were taken, not for the whole transit, but for the portion of time during which the vessels were actually in motion, it was only 5½ statute miles per hour, in the year 1882. The greatest speed recorded as having been attained on the canal by any vessel since the opening of the route, was 8·016 statute miles per hour, in the year 1870.

The cross-section of the Suez Canal was about one-half the area on promise of which the concession of the enterprise was sanctioned by the Porte; being 72 ft. wide at a depth of 26 ft., instead of 144 ft. wide at that depth. The sides were constructed with flat shallow shoulders, the rush of water over which at once eroded the slopes, and dragged back the vessel under way. The sides were now being gradually protected by artificial stone. If a cross-section of a semi-elliptical form had been adopted, with adequate side-walling, in the first instance, for an equal quantity of excavation below the water-line to that of the present canal the hydraulic radius would have been double what it now was; the resistance to propulsion would have been proportionately less; vessels of 4 ft. greater draught of water could have passed, and traffic in both directions at the same time would have been uninterrupted. By giving a larger cross-section of the same scientific form, any conceivable amount of traffic could be carried on. The cost of the canal, as constructed, was returned at 143,585*l.* per mile for execution (to the end of 1882), and 56,496*l.* per mile for management, financing, and interest of money, making 200,081*l.* per mile in all. The cost, at fair contractor's prices, of the walled semi-elliptical canal, 163 ft. wide at the top, and 30 ft. deep, came to 80,682*l.* per mile; and that for the large section, 240 ft. wide, and 30 ft. deep, to 112,280*l.* per mile. The area of the present cross-section of the canal was only three times as large as the immersed cross-section of such a vessel as the *Warrior*. It was impassable for modern vessels like the *City of Rome*, or the *Alaska* (to say nothing of the *Great Eastern*), or for any vessel drawing more than 24 ft. 9 in. of water. A mathematical calculation of the retardation caused by back-current in the canal showed that in the case of such a vessel as the *Warrior*, the retardation from this cause, due to the small size of the Suez Canal, was such as to reduce a speed in the open sea of 14·356 knots, to one of 9·812 knots per hour in the canal. This was independent of the further retardation due to the bad form of cross-section, and also of the direct retardation from shallowness and narrowness, which formed the subject of a separate mathematical investigation.

The various speeds attained on river and canal navigations in different parts of the world had been collected, and were shown in a tabular form. The sizes of locks; the time consumed in passing through locks, hydraulic lifts, and hydraulic inclined planes; and the dates of the River and Canal Acts of Parliament authorising improvements in the inland navigation of the United Kingdom, were also tabulated. The loss of time at present experienced was reduced to a function of the changes of level overcome by a canal. The heights to be surmounted by different canal routes in crossing England were indicated, and the conclusion was arrived at that by a scientific construction of canals and the application of steam power, a normal speed of five miles per hour, which was equal to the terminus to terminus speed of the mineral trains on certain English railways, might be readily attained on the inland water-ways of the country. For the cost of constructing and of working canals, reference was made to the thirty-seven pages of the Report of the Select Committee on Canals in 1883, contributed by the author of the paper, and to his Reports on the Comparative Cost of Transport by Railway and by Canal, which were reprinted by that committee. The cost, both of construction and of working, on the railways and canals of the United Kingdom, France, Belgium, and the United States; on the railways of New South Wales, India, and Pennsylvania; on the canals and lakes of America by steam colliers and by sea-going ships, was given in the Appendix to the Report of the Select Committee; and there was a statistical comparison between the capital cost and net earnings of the French and English railways; and of the mineral-carrying and non-mineral carrying trunk-lines among the latter. The cost of one-third of a penny per ton of cargo per mile was shown to pay working expenses, and five per cent. interest on capital for canal transport, being about one-third of the cost of corresponding transport by railway. The actual limit of the work done on a double line of railway in various countries was shown in a table, and might be compared with the almost unlimited capacity for traffic of a first-class canal.

SOCIETY OF ENGINEERS.

The first ordinary meeting for the present year of the members of the Society of Engineers was held on Monday last, February 4th, at the Town-hall, Westminster.

The statement of accounts for 1883 was read, after which the President for the past year, Mr. Jabez Church, M. Inst. C.E., F.G.S., &c., presented the premiums of books awarded for papers read during that year. These were to Mr. George Bower, for his paper on "The Bower-Barff Process of Preserving and Ornamenting Iron and Steel Surfaces"; to Mr. Chris. Anderson, for his paper on "The Feasibility and Construction of Deep-Sea Lighthouses"; and to Mr. Hamilton W. Pendred, for his paper on "Designs, Specifications, and Inspection of Ironwork."

Mr. Church announced that Lady Siemens had kindly presented to the Society seventy volumes on engineering subjects from the library of her late husband, Sir William Siemens, in remembrance of his long connexion with the Society of Engineers.

Mr. Arthur Rigg, the new president for 1884, then delivered his inaugural address. After referring to the work of the past session, and stating that the short educational courses of lectures commenced during the last president's term of office showed the interest taken by the Society in the education of engineers, the speaker referred to the extended cosmopolitan characteristics of engineering at the present time, and showed how it now embraced subjects so widely separated as the constitution of matter and the dynamical relationships of the heavenly bodies, and how chemistry and other sciences are now intimately related to engineering. Tracing the progress of engineering education in England from the great movement in Lancashire in 1839, which resulted in the establishment at Chester (under

the late Rev. Arthur Rigg) of what developed into the first engineering school in England, the speaker next showed how the superior technical training of Continental schools had influenced the English system, and how now the City guilds were as concerned to make trade secrets generally known as their predecessors were concerned to keep them in the knowledge of few. Regarding the older classical system, it was stated to have produced a higher order of men, endowed with more real wisdom than any mere technical training can supply; and the conclusion was reached that it would be far better to engraft technical education on the well-tried system of our ancestors, as this would be better suited to English temperament, than slavishly copying a Continental method, too often destructive both of originality and genius.

In illustration of the all-embracing character of modern engineering, the four substances, oxygen, hydrogen, carbon, and iron, were passed in review; and some of their extraordinary physical and chemical characteristics were pointed out. It was also shown how easily the engineer, in carrying out his designs, can bend the "inflexible" laws of nature to his varied requirements, simply by regulating the conditions under which they operate; how the electrical properties of iron, now under investigation, are revealing secrets related to its inner constitution; and perhaps to the anatomy of all matter. It is also bringing under prominent notice that mysterious ether which fills the pores of every substance, and apparently knows no bounds but the confines of infinity. This etherial thing seems the vehicle through which all the powers of nature act, though subject itself to none of their laws; and to appreciate its existence seems as far removed from our powers as to trace the essence of life.

The President remarked on theories, that they are the only guiding lights by which we can penetrate the gloom of all that is unknown, and that their value is only so far as they attain this end. The theorist deserves our gratitude, and may not be blamed if his ideas become shattered in the dust for others of wider scope and more general application. Nor can we wonder at the mistakes of science in its greater generalisations, when it is so profoundly ignorant of things open to its view on every side. If, then, such things are so, it is surely better than a great collection of undigested knowledge, to possess more of wisdom to apply such facts as we really know to practical account.

THE NATIONAL ASSOCIATION OF MASTER BUILDERS.

ON Wednesday, the 30th of January, at the Alexandra Hotel, Bradford, there was held the first meeting in that town of the National Association of Master Builders of Great Britain. The meetings of the Association are held half-yearly in different parts of the United Kingdom for the transaction of general business. Delegates were present from London, Manchester, Birmingham, Liverpool, Salford, Lancaster, Leeds, Bolton, Huddersfield, Stalybridge, St. Helen's, Northampton, Hull, Bristol, Clayton, Macclesfield, Lincoln, Warrington, Doncaster, and Bradford. After the report and accounts had been passed, a discussion arose with regard to forms of contract and tenders, and the mode of making out quantities. It was decided to appoint a sub-committee to confer with the committee of the Institute of British Architects upon the point. It was resolved that if a Bill making it compulsory that certificated engineers should be put in charge of boilers on land should be again introduced into Parliament the council of the Association should take steps to oppose it. Mr. Stanley Bird, of London, was elected president of the Association for the forthcoming year, and Mr. Cowlin, of Bristol, and Mr. Neill, were re-elected vice-presidents. Mr. J. C. White, of Liverpool, was re-elected treasurer for the year. The council is comprised of the same members as last year, with the addition of another representative each from Bradford and Manchester, the president of each local association being a member of the council, *ex officio*.

In the evening the Bradford Master Builders' Association entertained the delegates to dinner at the Alexandra Hotel. More than eighty persons sat down to a substantial repast, Mr. John Beanland, of Bradford, presiding.

After dinner the customary loyal toasts were drunk, and the Chairman proposed the toast of the "National Association of Master Builders." He said that the association began its existence at Birmingham, and had gradually increased in importance. The benefit derived from the Association in the present day was many times greater than that which accrued from it when it first started. He did not wish it to be understood that the associations was got up for the purpose of oppressing the men in any way. Its aims were just the opposite to that; they were to get the men well employed, and give them good work and wages, and preventing them from walking about the streets as they had done in the past. But it was also for the purpose of preventing unreasonable men from driving them into a difficulty, and the Association had been very useful in that respect. He hoped that the representatives of the Association which met in Bradford for the first time under its present name would go away satisfied with the Bradford builders, and that the local associations would be convinced that there were advantages to be derived from joining the general one which could not be gained in any other way.

Mr. Stanley Bird, of London, responded on behalf of the Association, and said that it was principally through the efforts of Mr. Beanland that the National Association had its birth. He also referred to the advantages to be derived from the connexion of a local organisations with the National Association, and pointed out that after its formation, and in his opinion to a great extent as a result of that, there had been no serious and general strikes in the trade. They were now frequently able to talk over grievances with the men, and, by reason of their combination, to settle differences in an amicable way. That was very much better than the protracted strikes which they had had in the past, and which brought nothing but misery and ruin to all concerned. After commenting upon the change in the attitude of the architects towards builders, he concluded by advising them to be always ready by means of thorough organisation, so that if the necessity came they could meet either the men or the architects.

THE HOSPITALS ASSOCIATION.

A MEETING was held on Friday, the 1st inst., at the Mansion-house, for the purpose of establishing a Hospitals Association, to consist of gentlemen connected with the various branches of hospital administration, the objects of which should be to facilitate the consideration and discussion of matters connected with hospital management, and, where advisable, to take measures to further the decisions arrived at, and to afford opportunities for the acquisition of a knowledge of hospital administration, both lay and medical.

The meeting was presided over in the first place by the Lord Mayor, and afterwards by Earl Stanhope.

Major A. H. Ross, M.P., chairman of the provisional committee, in an explanation of the objects of the association, said he hoped that the offices of the association would act as a storehouse where those interested in hospitals might find the plans of the newest and best systems of building, draining, and ventilating those edifices. Inventors of surgical appliances might submit their productions to the association, and thus gain publicity.

Sir T. Fowell Buxton moved the following resolution:—"That in the opinion of this meeting it is desirable to establish, under the name of the Hospitals Association, and on the basis of the constitution prepared and adopted by the provisional committee, an organisation for the consideration and discussion of matters connected with hospital management," which was seconded by Sir R. Alcock, and eventually carried; and the preliminary arrangements were, by another resolution, entrusted to provisional committees.

The Cost of the Rathhaus at Vienna. According to a statement in the *Deutsche Bauzeitung*, the Municipality of Vienna has granted a further sum of 210,000*l.* for the completion of the above building. It is, however, remarked that this estimate includes internal work of a technical and artistic character, the introduction of electric light, &c., so that the payment of the amount will necessarily extend over a more or less protracted term. The sum brings up the total cost of the structure to 1,250,000*l.*, as against an original estimate of 825,000*l.*

THE SURVEYORS' INSTITUTION.

PRELIMINARY EXAMINATION, 1884.

OF fifty-one candidates who presented themselves at the preliminary examination of the Institution, held on the 22nd and 23rd ulto., the following satisfied the examiners:—

Adkin, Benaiah Whitley	Lansdowne, Harold Walker
Burrows, Alfred John, Junr.	Lowe, Charles Robert
Callendar, William Jackson,	Perkins, Walter Frank
Cross, Arnold Charles Martin	Perks, Sydney
Dalton, Seymour Grant	* Phillips, William Dearlove
Eve, Herbert Trustram	Physick, Walter Frederick
Eve, William Harold	Puckridge, Percival Martin
Goodwin, Edward	Turner, Percy
Halton, Harry Russell	Vale, Henry
Hay, Mountiford Henry	Vowler, G. Reginald
Homan, Hubert Franklin	Warton, Wilfred
Hussey, John Walton	Watson, John, Jun.
Jonas, Harry Marshall	Whalley, Frederick Herbert
Junkison, Albion	Williams, Sydney
King, William Isaac	Worthington, James Scott

* Passed at head of list.

GLASS FLOORS IN FRANCE.

ATTENTION has recently been drawn to the above subject by a leading organ of the glass trade in Germany. While hitherto glass slabs have only been used to furnish light in certain portions of the flooring to the rooms below, the new building of the Crédit Lyonnais, on the Boulevard des Italiens, Paris, is referred to as affording an instance of an entire floor being constructed of glass. There are two basement stories, and the flooring of the higher of these, as well as of the ground-floor itself, is entirely composed of glass slabs placed between iron constructions.

Of late years glass flooring seems to have acquired increased favour in Paris for use in banks, commercial establishments, &c., on account of its durability and relatively moderate cost. The glass slabs are cut out in small squares, &c., to prevent their being slippery. These tiles are cast, and have a greenish reflection.

The article is regularly manufactured in Germany, and in a thickness of four-fifths of an inch costs from 8s. to 16s. per square mètre (10¾ square feet).

"WHAT ARE THE NEW WAR-OFFICES TO BE BUILT OF?"

SIR,—Your correspondent "H. M." [p. 146, *ante*] advocates the use of granite for these buildings, believing that the enormous expense necessarily involved would be cheerfully borne because "for all time it will defy the storms and weather." Allow me to point out that this would depend, as with Portland or other stone, to some extent, upon the quarry from which it came, and upon its careful selection, in proof of which a visit to some of the granite-built churches near Dublin will show that there the material has crumbled away to a terrible extent. Doubtlessly reluctance would very properly be felt in employing a foreign material if an English one as good and not more costly could be obtained; but I fear this is impossible, for I believe there is no stone in Europe for strength, durability, and economy to equal what is known as Belgian granite,—in reality a blue marble of great density, capable of sustaining, practically, the same weight as Scotch granite, and, when fine-axed, scarcely distinguishable from it in appearance. This material has been extensively used for many centuries throughout Belgium and in many other parts of the Continent, and work of the thirteenth and fourteenth century still shows the tool marks as sharply as on the day they were made. The quarries are, practically, inexhaustible, and blocks of enormous size are always obtainable. The New Palais de Justice at Brussels, one of the grandest and most stupendous buildings in Europe (whatever we may think of its style and details still a magnificent erection) is composed almost entirely of this material; so also the New Docks at Antwerp. In the new parish church at Hammersmith the same stone has been largely used. With regard to the question of economy, I may state that, before using it, I obtained tenders for the workmanship and material delivered from the principal Aberdeen granite-quarry owners, as well as from Belgium, and the lowest prices were, for Aberdeen granite 4,195*l.*, and for Belgian granite 940*l.*, more than 75 per cent. cheaper; in fact, about the same price as for Portland stone, averaging about 8s. 6d. per foot cube, and nearly all of it moulded and polished. I have since used it

in two more churches and in other work at similarly low prices, and can heartily commend it to any one wanting a handsome, durable material at moderate cost.

I notice that "H. M.," in referring to stone, says, "Allow the sap to go clean out of it before it is used." I am fully aware that almost every architect will say the same, but I have for years maintained that the system is wrong, and that if you want to render any stone perishable, the surest way is to buy it "well seasoned," then work and use it, and decay will follow sooner or later, as a matter of course. That stone ought to be seasoned before it is built in, particularly in winter, is unquestionably true; but the seasoning or drying should be done after it is worked, not before. I would ask "H. M.," or others who differ from me, and their name is legion, to try a few simple experiments for themselves. Let them take some well-seasoned stone,—and the more seasoned it is the better, they will doubtlessly say,—so let them try some thirteenth-century mouldings that have retained their original sharpness; let them re-work these, and in a very few years, or perhaps months, they will assuredly decay.* Again, let them take a block of seasoned stone, such as they would specify (but which, by the way, happily, they do not often get), let them try the outside with a chisel, and see how hard it has become; pour water upon it, and see how non-absorbent it is; then cut it open, and see how much softer the inside is, and how much more readily it absorbs water. The sap, I maintain, is the vital part of the stone, and in process of drying it comes to the surface, and forms a natural preservative. At the Grosvenor Hotel, Pimlico, the basement is of Portland stone, and this is decayed in many parts, but the upper portion is of Bath stone, and in this I fail to detect any signs of decay. I have heard that the Bath was specially quarried, and worked soon after, but not so the Portland. Perhaps some of your readers can inform me whether this is a fact; if so, it is a strong argument in favour of my theory. I have heard the same remark made of the stone used in building Somerset House, *i.e.*, that it was intentionally worked soon after being quarried. We hear it said of nearly every stone that it stands well in its own neighbourhood, but will not stand the London atmosphere. I believe this simply means that the old master-masons took it from the nearest quarry as they required it, and worked it with the sap in it; whereas most of the stone used in London is supplied by merchants who keep it in stock until the sap has dried out, and the only durable portion left is the outside. The importance of the question must be my apology for trespassing so much upon your valuable space.

HUGH ROUMIEU GOUGH.

6, *Queen Anne's Gate*, Jan. 28th 1884.

Sir, — In your issue of the 26th ult., "H. M." tells us that the question is being constantly asked, "With what stone will they be built?" and he then puts the following question on his own behalf: "Can the Government see their way to give us one fine building from the igneous rocks? The expense will be very great, but . . . . it will defy the storms and the weather." Perhaps as a very vigorous and enterprising First Commissioner will have the responsibility of settling this matter, "H. M.'s" desire may be realised. The question of expense, *i.e.*, relative extra cost of granite over freestone, depends entirely upon proper architectural treatment, or the reverse; upon attention to one of the first principles of our art, viz., that every material must be used in strict accordance with its natural characteristics; style and details must be so appropriate as at once to indicate the material. Moreover, in considering expense, it should not be forgotten that thousands of pounds sterling are at present paid in restoring the perishable stonework of existing buildings. The exterior of the Treasury, in Whitehall, is now being repaired at a cost of 8,000*l.* The Houses of Parliament absorb 2,500*l.* annually,—a capital sum of 70,000*l.* To preserve the stone, the east front of Buckingham Palace is periodically painted. The restoration of Lambeth Palace was completed a few months ago. St. Paul's had lately part of a column put to one of its porticos. Scarcely any important building is now erected without granite being employed more or less in its ornamental details. It is thus evident that it is much in favour with the profession, and it is, therefore, worth considering for a moment, whether in contemporary architecture it is applied in the most discreet manner possible. Is it not a mistake,—a waste of money,—to execute dentilled and burnished cornices in such an intractable material? Are not Renaissance columns and pilasters improper details when their material forbids you to furnish them with their legitimate capitals? Is it not wrong to put up door-jambs, the mouldings of which are so disproportionately bold as to suggest the engineer rather than the architect, and for no other reason than that it is almost impossible to execute properly proportioned delicate mouldings in granite? And is it not a glaring violation of good taste, to say the least of it, to insert brightly-polished columns and pilasters which never change, even in our smoky atmosphere, into façades mainly constructed of soft porous stone, which is defiled with soot before the workmen have departed? For my own part, I venture to think that if granite, porphyry, serpentine, and basalt were properly allied with a suitable style, and were not mixed up with an altogether unworthy inharmonious neighbour, not only would the most splendid result ensue, but there need be little, if any, extra cost; and I further venture to predict enduring fame for the architect who shall first present to the public eye a complete edifice constructed with these noble and everlasting materials. There exists sufficient evidence of their use from prehistoric times downwards. Why neglect them to-day? Little more than the determination to use them is necessary. They lie, so to speak, at our very doors. We pave our streets with them. Prime cost in London is little in excess of the best perishable freestone. The requisite machinery is available for surfacing and burnishing them at small cost. The appropriate details may be studied in almost any Italian or Oriental city, and detached specimens may be seen in our museums. Burnishing is necessary to exhibit the innate beauty of these materials, and the hard, smooth, and impenetrable surface thus obtained is just what is wanted for façades in this fuliginous climate. The highest artistic treatment,—a new Renaissance,—would be possible in the hands of competent designers, as the materials yield every tint and colour of the chromatic scale,—pure white from Okehampton, in Devon; silver grey from Gunnislake, in Cornwall; red syenite from Leicester; blue granite from Peterhead and Aberdeen; green serpentine from the Lizard; black basalt from Clee Hill, Salop; and, according to Dr. Borlase, a yellow granite from Cornwall. As to durability, it is only necessary to say that there are granite structures of various kinds in London from twenty to eighty years old, as perfect as on the day the workmen finished them. If, therefore, we desire our future buildings to be durable rather than perishable, it cannot be said that we have no experience to guide us in securing so desirable a result. T.

* This has been illustrated by painful experience, in church and cathedral restoration, many times.—ED.

ASSYRIAN ARCHES.

SIR,—In your last number [p. 161] there was the copy of a letter from me to Professor Newton, and I see that, in condensing my draft, I have made it appear to intimate that the arched vaults by which Victor Place and others suggest that the Khorsabad chambers were covered were pointed. This would, perhaps, get over the difficulty which Mr. Fergusson pointed out, viz., of spanning a 33 ft. chamber with sun-dried bricks, but M. Place is not responsible for the suggestion. I may mention that, whatever may have been the case at Khorsabad, the researches of Mr. G. Smith show the probable correctness of Mr. Fergusson's theory as to the ceilings having been supported by wooden columns.

I alluded, in the above letter, to the arched vaults still in use in Upper Egypt. I have not seen any drawings of their construction, so I annex a sketch of one which I saw at Edfou. I noticed many such vaults higher up the Nile.

The one sketched was about 16 ft. span, and built of sun-dried bricks in half-brick rings. Some vaults were larger, and formed of whole bricks.

Until they were quite set they must have required some such centring, as seems indicated in the Lycian arched tombs.

T. H. LEWIS.

THE DEFENCE OF BUILDINGS FROM LIGHTNING STROKES.

SIR,—Your well-timed and temperate article upon the above subject [p. 120, *ante.*], coming as it does simultaneously with the report of, and discussion upon, Colonel Parnell's paper, read before the Royal Institute of British Architects, is an earnest of the interest taken by you in the matter; and, as you represent the practical side of the question from the architect's point of view, I should like to be permitted to supplement your remarks by a few observations, specially relating to those "cases reported where buildings have been damaged notwithstanding the presence of lightning-conductors." Careful investigation into instances of damage where conductors have been present have revealed the fact that at the time of the lightning stroke the conductor was not in an efficient condition. Now it is evident that the value of a lightning-conductor is proportionate to its efficiency, and therefore that some method of ascertaining its condition is needed. An electrical test to ascertain its continuity and resistance is the only one that answers the purpose, and it is this part of the work in which I take an especial interest, coming as it does within the special province of the electrical engineer. All authorities upon the subject,—including the Lightning-rod Conference,—urge the necessity of these electrical tests; but one and all fail to give instructions as to the how of doing it. There is, however, no use in shirking the difficulty,—for difficulty it is, with ordinary conductors,—which involves the carrying of a testing-wire from the ground to the point of the conductor, so that the current may be sent through it to be passed down the conductor into the earth. The conductor would need filing, and the bare wire cleaning bright in order to ensure good contact. On the ground, what is called a good "test earth" needs to be provided, which, being obtained, the party testing is in a position to make the test. There are several instruments by which this can be done, but for accurate work the "Wheatstone Bridge" is generally used. The resistance of a good conductor of, say, ⅛ in. diameter, is considerably under one ohm, but oftentimes, through a bad earth connexion, it rises to seventy, eighty, and even hundreds of ohms resistance. From a test made by me of the conductors on York Minster in the autumn of 1881, and of those on Lincoln Cathedral in 1882, I can say that the conductors themselves were fair, but the earth connexions faulty, and this after a season of wet, when they would appear at their best or lowest resistance. This question of testing conductors is one of vital importance, as unless they are kept in a state of efficiency they are worse than useless; but, since it is proved that efficient conductors are valuable protectors of buildings, how essential is it to keep them in proper repair. This was noticed and alluded to by the *Daily News* on the 26th of August, 1880, as follows:—"That they" (lightning conductors) "must be properly constructed in order to be efficient is no reproach against lightning conductors, for it is true of most other safeguards against the calamities which our flesh is heir to. . . . . It is equally clear that they ought to be subject to some systematic supervision, so as to ensure that they shall be always in repair. . . . . With such precautions there can be no doubt that our dwellings and public buildings might be rendered absolutely safe at no very great addition to the cost of construction, not to speak of the saving of human life, which this important reform would unquestionably effect." In the case of tall chimneys and pointed church spires the cost of sending a steeple Jack up to the top with a testing-wire, say once a year, would be a heavy tax, and is, doubtless, the reason why so many persons who willingly pay for a conductor allow it to become neglected and valueless. To obviate this, and to save unnecessary danger after the first erection, I devised a special kind of conductor, which could at any time readily and easily be tested. It is in the form of an ordinary conductor, either rope or tape, with the testing-wire run up the centre, and soldered at the top to the conductor. When fixed, the testing-wire is divided at a few feet above the ground and connected to a couple of terminals in a little test-box, wherein is placed another terminal connected to a good earth for testing purposes. With such an arrangement the conductor can be easily tested at any time, without risk or danger, and at the most trifling

cost. For conductors already fixed, or new ones other than my "easily tested," form, I run an open or base wire to the top of the conductor, and connect it at the test-box in a similar manner to the other. The condition of the conductor being known by the tests, a remedy can be applied and the conductor kept efficient. For such work there is great need. A lightning-rod erecting and testing company, possessing public confidence, might do good work by testing and certifying yearly to the condition of conductors.

SAMUEL VYLE, Electrical Engineer.
4, *New Broad-street, E.C.*, Jan. 20, 1884.

INTERNATIONAL HEALTH EXHIBITION (1884).

SIR,—I hasten to address you upon a subject which I venture to think is of the utmost importance to exhibitors in the forthcoming Health Exhibition.

The committee in charge of Group 3,—the Dwelling House,—have resolved to erect in the grounds of the Exhibition a model dwelling, having the most perfect sanitary appliances.

Now, as I understand this proposal, the committee will build a house and place in it the appliances of certain makers. There will probably be Mr. X.'s flushing-tank, Mr. Y.'s water-closet, Mr. Z.'s disconnecting-trap, &c., and these will doubtlessly be things the committee have the highest opinion of. But would it not be inflicting a great injustice on the masses of exhibitors, and possibly misleading to the public, to place such appliances in this model building previously to the exhibits invited from the whole world being examined and judged? I submit that the placing of any maker's appliance in this house would be equivalent to proclaiming that it was the very best in existence, and would afford such a gratuitous advertisement as would be of much more commercial value than any number of awards or medals given afterwards.

I would further suggest that it would be much more just to erect the model dwelling after the jurors have made their awards, and then to bring into use, as far as possible, the various appliances that have received the highest marks of commendation.

SANITARY ENGINEER.

CARPENTERS' EXHIBITION.

SIR,—In reply to a letter in your last issue signed "Henry Dunkley" [p. 180], permit me to say that the main object the Carpenters' and Joiners' Companies had in inaugurating the Exhibition was to develope any latent talent there might be amongst the artisans employed in the respective crafts, and to promote a wholesome spirit of rivalry in producing really good work.

Were we to pretend to pay exhibitors the cost of their exhibits, we should be laying ourselves open to an unknown amount; and Mr. Dunkley must be aware that at no exhibition of any kind are the prizes offered supposed to be of the value of the exhibits.

I know the fact of having gained a prize in the exhibitions held by other City companies has proved of very great advantage, as a recommendation to future employment. It is in this way we hope to benefit the recipients of prizes in our Exhibition, of whom, I hope, Mr. Dunkley will be one; and though "honour cannot set a leg," it can materially assist in giving a "leg up" to those who gain it.

STANTON W. PRESTON,
Clerk to the Carpenters' Company.
Carpenters' Hall, February 6th, 1884.

TECHNICAL EDUCATION.

SIR,—Will you allow me to correct a slight error (no doubt a slip of mine) in your admirable report of the discussion upon Mr. Harland's paper [p. 175, ante], read at the Artisans' Technical Association?

I am reported to have said "that the Science and Art Department gave two science certificates."

It should read to this effect:—"The City and Guilds Institute required two science certificates before granting a full technological certificate to the candidates who have passed their examination, and my idea is that the directors of the Institute should insist upon the possession of an equivalent art certificate in addition to those in the science subjects."

Of course, I am speaking for my own trade only.

W. A. BARBER.

Lincrusta - Walton.— Messrs. Frederick Walton & Co. (Limited) inform us that "Lincrusta-Walton" has been awarded a gold medal and first-class certificate at the Calcutta International Exhibition.

VENTILATION.

SIR,—I shall be glad if you will allow me space to reply to a letter that I see in your last issue [p. 180], with reference to the subject of ventilating rooms, &c. I saw in use a short time since a ventilator that certainly possesses all the qualities necessary for ventilating rooms well. The "Harding" ventilating system is the one I refer to. The great advantage of the system is that fresh air is admitted into the room with absolutely *no draught* or chilly sensation being felt. The incoming air is thoroughly purified by a patent method from all dust or soot or other impurities, so that the room is kept supplied with fresh *clean* air. With reference to the outlet for the vitiated air, the fireplace is usually found sufficient as an extractor when there is a good inlet; but in rooms where many people are likely to assemble, one or two of the well-known mica valves are inserted in the flue near the ceiling. I have personally tested the system, and feel confident that your correspondent will be satisfied if he uses it. The inlets are made in several very good designs, so as to suit any room or building.

Messrs. Strode & Co., of London, the well-known gas and ventilating engineers, are the only agents for the system.

I believe the Leeds School Board is employing the system in their schools. ARTHUR KEEN.

ENSILAGE.

SIR,—With reference to this subject now being discussed in your columns, we quote a few words spoken by Lord Walsingham the other day, which show the immense value of ensilage. He says:—

"I look to the use of ensilage, which has now passed beyond the stage of experiment and must be regarded as a successful new departure, to become a valuable factor in all farming calculations of the future. If it can be conclusively proved, as I believe it can, that a field of lucerne, of sanfoin, or of grass, will supply to the mouths of our sheep and cattle more than four times the weight of good and nutritious food if made into ensilage than if made into hay, and this without risk of loss in quantity or in quality, what is to prevent us from keeping at least three times the number of live stock that we now keep, and realising more than double the profit we are now able to show upon that branch of our accounts."

As to the construction of silos, we prepared plans for Lord Walsingham's agent, Mr. H. Woods, of Merton (well known as a most scientific agriculturist) as to the conversion of old clay-built barns on the estate into silos. It was determined to convert one bay at first, and across the bay front was put up a 14 in. brick wall to within 3 ft. 10 in. of the tie-beam, and two division walls of the same description, which gave three silos, each 14 ft. 4 in. in length, 6 ft. 3 in. in width, and 9 ft. 3 in. in depth; the cubic space being sufficient for at least fourteen or fifteen tons of ensilage; but there is no reason why 2 ft. more brickwork should not be added to the height of the walls, so as to make room for three tons additional, or seventeen or eighteen tons in each silo. The barn floor was laid with asphalte some years ago, and therefore the silos required no new bottom. The walls were covered with cement plaster, composed of Portland cement and well-washed road silt, in the proportion of three of cement to one of silt. This coating, which was about ¼ in. in thickness, answered well in every respect, and showed that even clay-built barns are easily convertible into good silos. To prevent the brickwork being displaced in the filling process, a 2½ in. plank, 1 ft. 2 in. wide, was properly secured to the wall top; and to facilitate the emptying of the silos, a well-made 1½ in. boarded door, protected by a coating of hot tar and pitch, was inserted in one corner of the front wall of each silo. The frames of the doors were set on the inside so that the doors opened inwards to the partition walls, and the apertures were hermetically sealed by means of 4-in. brickwork on the front sides. The total cost of these three silos did not exceed 30*l*. When the silos were quite filled with grass (which is much more closely packed if cut into chaff before ensilaging), the contents having been as well trodden and rammed down as possible, they were covered with wode n shutters, over which was spread a bed of coarse bran about 8 in. deep. For weights, clean flint stones were used in wicker skeps, costing 1s. each, and lasting many years. The pressure over the whole surface was 1½ ton to each silo of 15 tons. The cost was 12s. 9d. per acre, and had the crop been made into hay, it would have averaged about 1½ ton to the acre. Now the average cost of making 1½ ton of grass with hay, stacking, and afterwards cutting into chaff, is from 25s. to 26s. per acre. Thus ensilage is produced at a saving of 50 per cent. on the cost of ordinary hay-making and chaff-cutting.

We also prepared plans, &c., for over-ground silos for the storage of 100 tons in four silos under one roof. The size of these were:—Length, 17 ft. 6 in., width, 9 ft., depth 10 ft.; total length of silo, 38 ft. 6 in., width, 21 ft. 6 in.; walls, internal and external, 1 ft. 2 in., and 4 in. concrete floors, and coated (as well as walls) with ¾-in. cement of equal Portland cement and well-washed road silt. The walls were tied together with 1-in. iron rods. A door was provided for each silo, and one in each gable for the filling of the grass into the silo. The total cost for the whole building was 175*l*. In the event of a landlord assisting the tenant in the erection of such a building at the rate of 5 per cent. on the outlay, the tenant would obtain a silo at the moderate yearly charge of 1s. 9d. per ton on his ensilage.

OLDHAM-CHAMBERS & WILLINS, F.R.I.B.A.

PROVINCIAL NEWS.

Stratford-on-Avon. — On the 30th ult. Mr. Arnold Taylor, an Inspector of the Local Government Board, held an inquiry at the Town Hall, Stratford-on-Avon, with reference to an application by the Corporation to borrow the sum of 23,500*l*. for works connected with a water supply, and also the disposal of the town sewage. The Corporation proposed to borrow, in addition, 600*l*. to complete the purchase of certain property known as the Bancroft, which it is intended to lay out as public gardens and recreation grounds for the free use of the inhabitants for ever. Amongst those present were the Mayor of Stratford (Mr. Hodgson, C.M.G.), the ex-mayor, the town clerk (Mr. T. Hunt), Mr. Pritchard, C.E., of Birmingham; the medical officer of health, borough surveyor, and most of the members of the town council. The town clerk said all the notices had been served, and notices had also been forwarded to the Local Government Board. He was pleased to say that there was no opposition to either of the schemes. Mr. Pritchard, C.E., at the request of the inspector, gave an outline of the two schemes, remarking that a provisional order had been obtained to do the work. With regard to the water scheme, he proposed to go to Snitterfield, four miles distant, and abstract from a brook in a field belonging to Mr. R. N. Philips, M.P. He proposed, in addition, to construct a conduit 3,250 ft. in length, whence a supplementary supply would be obtained. A reservoir to hold 15,500,000 gallons would be provided in case the supply should fall short. He explained the scheme for the disposal of the sewage, which, at the present time, is put into the river. He proposed a system of broad irrigation and downward filtration. Part of the land to be utilised belonged to the Corporation, and other portions had been purchased of the late Marquess of Hertford. The sewage would be distributed over the ground by centrifugal pumps, worked either by steam or powerful gas engines. He estimated the cost required to complete the works at 23,500*l*. The inspector intimated that he regarded the schemes favourably, stating they had evidently been well and carefully considered, and he would report in due course to the Local Government Board.

Barrow-on-Soar.—The erection of new Portland cement works has just been brought to a conclusion by Messrs. John Ellis & Sons, at their lime works, Barrow-on-Soar. The buildings are of Thurmaston red bricks, laid in special mill-prepared mortar, supplied to the contractor by Messrs. Ellis. They consist of engine and boiler-houses; six-stone mill of three floors; building containing crushing machinery; cement store, with railway siding communicating with the Midland Railway main line; kilns, chimney shaft, drying store, and cask sheds; offices, laboratory, and testing-house. The roofs throughout are covered with Swithland slates, from Messrs. Ellis & Sons' own quarries. The builders were Messrs. Clark & Garrett; the slating is by Messrs. Ellis, Partridge, & Co.; the woodwork by Mr. Alfred Plant; and the constructional ironwork by Messrs. Gimson & Co., all of Leicester. The earth and concrete work and erection of kilns has been done by Messrs. Ellis & Sons' own workmen. The machinery throughout is the work of Mr. Frank Ashwell, of Leicester. The works have been designed by Mr. Charles Spackman, and carried out under his supervision.

Abergavenny.—Plans prepared by Mr. E. A. Johnson, architect, of Abergavenny, have been adopted for the laying out of a new park for that town. Tenders will shortly be invited for carrying out the work, which includes a large area of planting and earthwork, a cricket pavilion, grand stand, entrance lodge, boundary fences, railings, gates, and carriage drives.

Birmingham.—An extensive range of buildings has just been completed in Albion-street, Newhall-hill, for Messrs. Bishton & Fletcher, diamond workers, goldsmiths, and manufacturing jewellers. The façade is Italian, and is executed in red bricks, with Greensill stone

strings, sills, and main cornice. The internal arrangements of the various floors have been carefully planned to meet the peculiar requirements of the various branches of the firm's business. The heating of the premises is effected by the hot water system of Mr. R. Renton Gibbs, of Liverpool. The whole of the works have been carried out by Mr. Thomas Hughes, builder, of Hockley, under the supervision of the architect, Mr. W. Tadman Foulkes, of 100, Colmore-row, Birmingham.

Books.

Farm Buildings. By John Scott. Published by Crosby Lockwood & Co., London.

Only those who, like the present writer, spent their early years in an English farm-house,—alas! *too* many years ago,—can fully appreciate the progress which has been made in some directions in the architecture of the farm. The deep miry ways, the stagnant, noisome pools, the general presence of "matter in the wrong place," the casual scattering of the farm-buildings, the happy-go-lucky ways of the jolly farmer and the haphazard character of all his surroundings have all disappeared, or nearly so, in presence of the ever-increasing difficulty of making both ends meet. And with them we have lost all the picturesqueness of one of the most picturesque elements in English landscape. We have exchanged the lichen-covered walls in ample and effective masses of ashen-grey stone, or ruddy brick, and have got in their place the muddy-brown stock brick, or the still more colourless and uninteresting concrete; while for the snug thatch and the warm many-tinted tiles we are put off with corrugated iron, or the "Willesden roofing-paper"! Art has given way to science, and the modern homestead is a model of cheap fragile construction, and of a precise and mechanical disposition of parts arranged in nicely-calculated sequence with a severe regard to the attainment of the largest practicable return for the smallest possible investment.

There are, of course, certain clear gains which must be credited to the new system. Healthier sites are chosen, where the air is pure and fresh, and can circulate freely, where water is good and abundant, and where the subsoil is favourable to effective drainage. These matters were neglected by our forefathers, and it was by so much the worse for them, and for us. Nowadays the very pigs have more consideration than of old fell to the lot of their masters.

"My piggeries are upon a well-drained site," writes an artist in this branch of farming, "with a southern aspect; they have plenty of fresh air and light; ample provision exists for warmth in winter and shelter in summer; their floor is of hard gault bricks laid in cement, and at the rear of the piggeries a field has been fenced off as an exercising ground so necessary for developing the legs of the young boars."

Would that our young Christians had the same opportunities. "Please the pigs," was a favourite expression of our grandsires; but the pigs never had those pleasures which attend their more fortunate posterity, thanks to Mr. Scott and his followers. The late Mr. Wright (comedian) was treated with marked indulgence by the "Pawnee Indians," but his diet failed to nourish him when he became aware of the real object of his captors' solicitude. It is as well that as the lamb "licks the hand just raised to shed its blood," so the young boars should develope their legs in peace, and without so much as suspecting that there is such a commodity as ham in the world.

As might have been expected, the Americans are foremost in the cool effectiveness with which they manipulate this harmless necessary animal, from his cradle to his grave; and if there ever was any poetry in the pig, it has evaporated in the American example of his home and accessories given at p. 103 of this "thorough" treatment of his home.

The arrangement of farm buildings is really a matter for the ingenuity of a scientific farmer, but their economical construction affords scope for a good deal of professional ingenuity, and there are ample opportunities for the practical architect in elaborating the details which facilitate the numerous processes carried on in the modern farm-yard.

The author gives numerous plans of executed homesteads, but wisely cautions his readers against attempting to reproduce any of them without the advice of an architect. Experience has proved that there is nomore frequent source of danger than this, buildings designed to suit one set of conditions being sure to disappoint those who unthinkingly repeat them in other and widely different circumstances. As a precaution against this class of failure the specifications and estimates might as well have been omitted. The particulars are of little or no use to a professional man, and to any other the limited nature of their applicability would be misleading. We do not think that the cottage plans given are the best which could have been selected, and in the very small and cheap single room corrugated-iron cottage a useless and (comparatively) costly "bay-window" might surely have been dispensed with.

We entirely agree with the author that in a farm-house "the hall should form a comfortable apartment and not be a mere passage with side doors opening into the sitting-rooms," and we are sorry to see that in his plans,—and notably in that on p. 78,—this wise maxim is not followed.

But, after all, these are remarks which a critic is driven to, who must perforce admit, notwithstanding minor faults, the general excellence of the work put into his hands. It stands all the tests we have been able to apply to it,—and there is something about the treatment of the whole subject which carries with it the conviction that it is the work of a practical man. No one who is called upon to design farm-buildings can afford to be without this handy little work, which contains almost all that such a one should know, and which is, moreover, brought down to the latest date.

We ought not to conclude without a reference to the clear, concise, and unaffected style of the author, whose previous works on drainage, water supply, &c., we have had occasion to notice approvingly.

MEETINGS.

Saturday, Feb. 9.

Architectural Association.—Visit to Houses in Harrington-gardens. (Messrs. Ernest George & Peto, architects.) 3 p.m.

Provident Institution of Builders' Foremen and Clerks of Works.—Dinner at St. James's Hall, Piccadilly. 6·30 p.m.

Monday, Feb. 11.

Surveyors' Institution.—Discussion on Mr. T. M. Rickman's paper on "Building Risks and their Incidence." 8 p.m.

Society of Arts.—Mr. Thomas Bolas, F.C.S., on "Recent Improvements in Photo-Mechanical Printing Methods: Intaglio Plates, Collotypes, &c." (Cantor Lecture). 8 p.m.

London Institution.—Prof. Ruskin will repeat his lecture on "The Storm Cloud of the Nineteenth Century." 5 p.m.

Tuesday, Feb. 12.

Parkes Museum of Hygiene (74A, Margaret-street, W.)—Mr. J. P. Seddon, F.R.I.B.A., on "The Ventilation of Theatres." (Mr. George Godwin, F.R.S., in the chair.) 5 p.m.

Institution of Civil Engineers.—Continued discussion on Mr. F. R. Conder's paper on "Speed on Canals." 8 p.m.

Society of Arts (Foreign and Colonial Section).—Mr. H. H. Johnston on "The Portuguese Colonies of West Africa." (Sir F. J. Goldsmid in the chair.) 8 p.m.

Royal Institution.—Dr. Archibald Geikie, F.R.S., on "The Origin of the Scenery of the British Isles." 3 p.m.

Wednesday, Feb. 13.

Society of Arts.—The Rev. J. A. Rivington on "A New Process of Permanent Mural Painting, invented by Adolph Keim, of Munich." (Mr. Hubert Herkomer, A.R.A., in the chair.) 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. A. A. Myall on "Machine Tools." 7 p.m.

Thursday, Feb. 14.

Society of Antiquaries.—Mr. J. H. Middleton, F.S.A., "On the Recent Discoveries in the Temple of Vesta in the Forum of Rome." 8·30 p.m.

Society of Engineers.—Mr. J. W. Wilson on "Materials used by Engineers in Construction." 7·30 p.m.

Society for the Encouragement of the Fine Arts.—Mr. Lennox Browne, F.R.C.S., on "Science and Singing." 8 p.m.

Society of Telegraph Engineers and Electricians.—Messrs. R. E. Crompton and G. Kapp "On some New Instruments for Indicating Current and Electro-Motive Force." 8 p.m.

London Institution.—Mr. F. Gale on "Modern English Sports,—their Use and Abuse." 7 p.m.

Friday, Feb. 15.

Architectural Association.—Mr. Lewis H. Isaacs on "The Local Government of the Metropolis: its Relation to and Effect on London Street Architecture." 7·30 p.m.

University College.—Prof. C. T. Newton on "The Tomb at Djölbashi." 4 p.m.

Society of Arts (Indian Section).—Mr. J. M. Maclean on "State Monopoly of Railways in India." (Sir James Caird in the chair.) 8 p.m.

Royal Institution.—Prof. T. E. Thorpe on "The Chemical Work of Wöhler." 9 p.m.

Institution of Civil Engineers (Students' Meeting). Messrs. Cowan and Fawcus on "A Light-draught Launch." 7 p.m.

Miscellanea.

Serious Frauds upon a Vestry.—At the Central Criminal Court, on Saturday last, before the Recorder, William Berry Clarke, Charles Kennedy Jordan, and John Williamson, junior, were convicted upon an indictment charging them with a conspiracy by false pretences to obtain from the Vestry of the parish of St. Mary, Islington, certain large sums of money, and with conspiring to defraud the Vestry by rendering to the members false accounts of the amount of material supplied to the Vestry by Williamson, and by false and forged entries in the books and altered documents and receipts. The prisoner Jordan pleaded guilty to the conspiracy counts, but the other defendants not guilty. Clarke was the surveyor of the Highways Department of the Islington Vestry, Jordan was the principal clerk in the same department, and Williamson was a contractor employed by the Vestry for the supply of flints and materials for repairing roads. Jordan gave evidence in support of the case. The jury, without leaving the box, returned a verdict of guilty against Clarke and Williamson. A strong appeal for mercy was made on behalf of Clarke, whose wife is stated to have lost her reason in consequence of the proceedings. The Recorder sentenced Clarke and Williamson to eighteen months' and Jordan to six months' imprisonment, with hard labour.

Sanitary Inspectors and the Homes of the Poor.—On Saturday last a general meeting of the Association of Public Sanitary Inspectors was held at 1, Adam-street, Adelphi, under the presidency of Mr. E. Chadwick. The chairman, in opening the proceedings, expressed the hope that recent agitation on sanitary matters would lead to a great improvement in the position of inspectors, and that in future, instead of working down to ignorance and against sinister influences, they would be able to work up to knowledge. It was, he observed, gratifying to think that, mainly through the efforts of sanitary inspectors, three-quarters of a million of lives had been saved during the last decade. The secretary, Mr. Legg, stated that since the last meeting ninety inspectors throughout the country had joined the association. A discussion was then opened by Mr. Jerram (Walthamstow) in reference to the housing and sanitary inspection of the dwellings of the poor; and Mr. Poulson (Tottenham) subsequently read a paper on "Procedure in dealing with Nuisances."

The Institution of Civil Engineers.—We are asked to state that the series of meetings for the reading and discussion of papers by students of this society will be continued on Friday evenings, the 8th, 15th, and 22nd inst., at seven o'clock. The chair will be occupied successively by Messrs. J. Wolfe Barry, B. Baker, and T. R. Crampton. The subjects to be dealt with are:—1st, "Constructional Ironwork for Buildings," by Mr. Richard Moreland; 2nd, "Light-draught Launch," by Messrs. Cowan & Fawcus; and 3rd, "The Qualities of Metal for various purposes," by Mr. D. G. P. Davies. Those students who have promised or are engaged on papers for reading at meetings of members of their body have been requested to complete and forward them to the Institution as soon as possible, so that no break may occur in the continuity of these meetings.

Railway Information.—The first half-yearly issue of the "Railway Companies' Directory," edited by Mr. Percy Lindley, giving the capital, authorised, received, and expended, the revenue, dividends, and mileage, with classified lists of the directors and officers of the railways of the United Kingdom, will be published next week.

Edinburgh Architectural Association.—The usual fortnightly meeting of this Association was held last Wednesday, at 20, George-street, Edinburgh, Mr. John McLachlan, past-president in the chair, when Mr. Thos. Hume read a paper on "Practical Plumbing."

Early Rising.—The proper time to rise is when sleep, properly so-called, ends. *Dozing* is not admissible from any reasonable or health point of view. The brain falls into the state we call sleep, and the other organs of the body follow it. True sleep is the aggregate of sleeps. In other words, sleep, which must be a natural function,—*i.e.*, physiological instead of pathological, or induced by disease or drugs,—is a state which consists in the sleeping or *rest* of all the several parts of the organism. Sometimes one and at other times another part of the body as a whole may be the least fatigued, and so the first to awake, or the most exhausted, and therefore the most difficult to arouse. The secret of good sleep is,—the physiological conditions of *rest* being established,—to so work and weary the several parts of the organism as to give them a proportionally equal need of rest at the same moment. The cerebrum or mind-organ, the sense organs, the muscular system, and the viscera should be all ready to sleep together, and, so far as may be possible, they should be equally tired. To wake early and feel ready to rise, this fair and equal start of the sleepers should be secured; and the wise self-manager should not allow a drowsy feeling of the consciousness or weary senses, or an exhausted muscular system, to beguile him into the folly of going to sleep again when once his consciousness has been aroused. After a very few days of self-discipline the man who resolves not to "doze,"—that is, to allow some still sleepy part of his body to keep him in bed after his brain has once awakened,—will find himself, without knowing how, an "early riser."—*The Lancet.*

Meteorology.—The last of a course of eight lectures on "Meteorology," by Mr. W. Marriott, F.R.M.S., was delivered on Thursday evening, January 31, in the reading-room of the Society of Engineers, 6, Westminster Chamber, Victoria-street, Westminster, Mr. Baldwin Latham, past-president, in the chair. The subjects treated in this lecture were climate and weather. Climate is regarded as being made up mostly of temperature, rainfall, and the prevalence of certain winds. It was pointed out that there are various kinds of climate, the two most marked being continental and insular. The British Islands enjoy an insular climate, which is shorn of all severity by the genial influence of the Gulf Stream. Climate also depends upon elevation, aspect, and soil. The various so-called health resorts were referred to as generally possessing some peculiarity in situation, thus rendering the air either bracing or relaxing, and so making it suitable for the treatment of various diseases. After pointing out the influence of weather on certain diseases, the lecturer showed that, although British weather is very changeable, it nevertheless obeys certain laws. All our weather is related to the distribution of atmospheric pressure, and it is by the collection of observations made at the same instant at various places and telegraphed to the Meteorological Office, where charts are prepared and carefully studied, that the forecasts are made, and storm warnings issued. The lecturer concluded by giving a number of weather prognostics and sayings, explaining them by means of isobaric charts.

From the "Asclepiad," a new quarterly magazine of original research and observation in the science, art, and literature of Medicine preventive and curative (published by Cade & Caulfield), we extract the following suggested test for the presence of lead in water:—"A solution of cochineal produced by digesting one part of cochineal in a hundred parts of proof spirit is first made. An ounce of distilled water is next placed in a white porcelain dish, and ten drops of the cochineal solution are added and mixed so as to give to the water a distinct rose-red colour. An ounce of the suspected water is then treated in another white porcelain dish in precisely the same manner, when, if lead be present, a purple-blue tint is struck, varying, according to the dilution, from a purple-blue to a light pink-purple. One part of lead in seventy thousand parts of water, or one grain in a gallon, gives a most distinct purple-blue colour under the test. With careful manipulation, one part of lead in seven hundred parts of water, or one grain in ten gallons, gives a characteristic purple-pink." The magazine is edited by Dr. B. W. Richardson.

Hampreston.—Four two-light Munich windows have just been erected in the chancel of Hampreston Church, Hants, representing various subjects from the life of Christ. They are from the studios of Messrs. Mayer & Co.

Electric Lighting.—The lighting of the new Princes Theatre (of the exterior of which we gave a view a little while since) forms one of the most important experiments in electric lighting which has been recently ventured upon The lighting has been arranged and carried out by Messrs. Strode & Co., the well-known gas and electrical engineers. The auditorium is lighted by four electroliers from the ceiling, each having nineteen Swan incandescent lamps of 20-candle-power, and, round the fronts of the first and second circles, there are forty-eight brackets, designed by the architect, each having three Swan incandescent lamps of the same power, whilst the entrance vestibule, grand staircase, foyers, corridors, and passages are brilliantly lighted by the same kind of lamps on pendants, brackets, figures, &c., made by Messrs. Strode & Co. to Mr. Phipps's design. The foot-lights, technically known as the "Float," also consist of fifty Swan incandescent lamps, so that the screen of heated air and products usually caused by gas footlights between the audience and the performers does not exist. There are 300 incandescent lamps altogether, which are supplied with current by one of Siemens's shunt dynamo-machines working into a large number of Faure-Sellon accumulators, so that it is not necessary that the engine (a 12-h.p. Sterne's gas-engine) should be constantly working. The working stage-lights are gas, and Messrs. Strode & Co. have also fixed one of their large sun-burners in the centre of the auditorium, and one of their improved flash instantaneous lighting gas-floats, which principle is also applied to the battens and other stage lights, and many of the brackets in corridors and staircase are made to carry gas-lights as well as electric lamps, so that, although the front of the house is usually lighted by electricity, it can, if necessary, be entirely lighted by gas.

Adjustable Electric Thermometer.—We have had brought under our notice a description of an improved electric thermometer, for the purpose of giving alarm in case of fire, and affording protection from damage by frost in conservatories, &c. As ordinary fire-alarms, electric thermometers have been in use for many years, but hitherto great difficulty has been found in constructing a reliable instrument capable of ready adjustment by the inexperienced hand, and of withstanding exposure to all weather and climates. Messrs. Francis & Co., the telegraph engineers, claim to have overcome this difficulty, as their improved thermometer can be set to any degree, and gives notice, by bell, at however great the distance, of the rise or fall of temperature. By one scale it is permanently set to give instant alarm when the temperature falls to, say, 34°, and by another scale ready adjustment can be made to give notice of a rise to any point desired. In the process of incubation throughout the ostrich-farming districts of South Africa, the wine-growing provinces of Spain and Portugal, as also in numerous vineyards in different parts of the world, the electric thermometer has been found most valuable, and the additional advantage of ready adjustment to any degree will probably be appreciated as giving a completeness to a system which has already proved of such great service in the protection of property under varied circumstances. The invention may be adapted for use on shipboard as a means of protection against the spontaneous combustion of cargoes, and of giving instant alarm on the outbreak of fire in any part of the ship.

The Sixth Annual Dinner to the *employés* of Mr. James Hill, City Lock Depôt, 100A, Queen Victoria-street (late of Upper Thames-street), took place at the Holborn Restaurant on Friday evening, the 1st inst., and was of special interest, as celebrating the inauguration of the new premises. The chair was occupied by Mr. Hill, and the vice-chair by Mr. Ritchie, of Messrs. Steven, Bros., & Co., Upper Thames-street. A number of friends were present, the usual toasts were honoured, and a very pleasant evening was spent.

Wood-working Machinery at the Calcutta Exhibition.—We are informed that the exhibits of Messrs. Thomas Robinson & Son (Limited), of Rochdale, at the Calcutta Exhibition, consisting of wood-working machinery, steam-engine and boiler, have been awarded the Gold Medal.

New Buildings, Fenchurch-avenue.—The marble mosaic paving laid at No. 4, Fenchurch-avenue, E.C., for Messrs. Colls & Sons, as mentioned in our last (p. 176) was executed by Mr. J. F. Ebner, of Clerkenwell-road.

Proceedings against Builders. — On Saturday, at Brentford Petty Sessions, Mr. E. Van Camp, builder, of Kilburn-rise, was charged with the infraction of various building by-laws of the Ealing Local Board. It appeared from a statement of Mr. Charles Jones, surveyor to the Local Board, that the by-laws were made with the express object of putting down the bad building which prevailed. Defendant was charged in the first place with not having 6 in. of concrete covering the foundation before erecting the wall; but this case had to be adjourned because the defendant refused to take up the flooring to allow the surveyor to test it. Defendant contended that the work had been done, and the surveyor might have seen it if he had been there at the proper time. The defendant said his was a well-known firm, and he was not a jerry builder. Defendant was then charged on a second summons with not carrying the abutments to a sufficient depth. He said the defect had since been remedied. Fined 40s. A third summons charged defendant with not constructing "water or earth closets" with windows giving an opening of 1 ft. to 2 ft., exclusively of frame, to let in the external air. Fined 40s. Fourthly, defendant was charged with not allowing a space of 3 in. between the concrete and the floor, for circulation of the air. Fined 40s. Mr. Millwood was charged with not having a space of 15 ft. at the rear of some buildings erected by him in Ealing. Fined 20s.

Artistic Metal Work.—In consequence of numerous applications from the provinces and from many workmen desirous of seeing the Loan Collection of Ancient Iron and Steel Work, organised by Mr. A. Newman at the Galleries of the Mediæval Arts, 176, New Bond-street, the exhibition will continue till the 28th of February. Artisans at three p.m. on Saturdays.

TENDERS.

For new blocks and alterations at the Swansea Workhouse. Messrs. W. D. Blessley & Aspinall, architects, Swansea:—

	New Blocks.	Alterations.
H. Billings, Swansea	£29,125 5 9	£12,077 2 0
T. White, Swansea	29,500 0 0	8,600 0 0
E. Morgan, Tredegar	25,331 0 0	9,889 0 0
D. Morgan, Swansea	24,989 0 0	9,211 0 0
J. D. J. Davies, Cardiff	24,800 0 0	9,300 0 0
J. T. Riley, Fleetwood	22,651 4 4	10,364 9 8
J. B. Lewis, Swansea	22,530 12 8	7,662 4 7
T. Watkins & Jenkins, Swansea (accepted)	21,100 0 0	7,900 0 0

For the erection of ten houses at Clacton-on-Sea, for Mr. Charles Garrood. Mr. T. W. Garrood, architect, Forest Hill:—

Gee	£3,800 0 0
Archer	3,640 0 0
Wood	3,362 0 0
Coe	3,250 0 0
Johnson	2,976 0 0
Hall	2,950 0 0

For road making, sewers, manholes, ventilators, &c., on an estate at Hampstead, for the directors of the National Liberal Land Company. Mr. George Pooley, surveyor. Quantities by Mr. P. E. Murphy:—

W. Carter, Anerley	£1,469 0 0
S. Chafen, Rotherhithe	1,428 0 0
G. Felton, West Hampstead	1,247 0 0
J. E. Bloomfield, Tottenham	1,200 0 0
W. Nicholls, Wood Green	1,185 0 0

For alterations to Nos. 3 and 4, Mulgrave-road, Sutton' Surrey, for the executors of Mr. J. R. Hall. Mr. Herbert D. Appleton, architect, 157, Wool Exchange:—

Roberts	£470 0 0
Humphris	450 0 0
Evans	398 0 0
Potter	380 0 0
Parker	375 0 0
Robinson	335 0 0
Wootton	298 0 0

For the erection of an additional infant school to the Board Schools, Oystermouth, near Swansea. Mr. J Buckley Wilson, architect:—

D. Richards & Son	£710 9 0
T. Watkins & Jenkins	580 0 0
Lloyd Brothers	525 0 0
B. Lewis	506 0 0
D. Thomas	495 0 0

[Architect's estimate, about 500*l.*]

For the erection of Eastbourne Town-hall. Mr. W. T. Foulkes, architect, Birmingham:—

Harris, Norwich	£38,000 0 0
Morris, East Grinstead	36,500 0 0
Perry & Co., Borough	35,787 0 0
Peters, Horsham	35,591 0 0
Avard, Maidstone	34,800 0 0
Longley, Crawley	34,500 0 0
Weldon, Aldershot	34,500 0 0
Bissett	34,000 0 0
Wren, Eastbourne	33,515 0 0
Everett, Colchester	32,450 0 0
Broadwood, Wolverhampton	31,990 0 0
Fell	31,684 0 0
Peerless, Eastbourne	30,125 0 0
Hudson, Kearley, & Co., Brighton	30,000 0 0
Foster & Co., Rugby	29,999 0 0
Greenwood	29,915 0 0
Bull, Southampton	29,800 0 0
Dore & Son, Eastbourne	28,745 0 0

For finishing and completing six houses in Highlever-road, North Kensington. Mr. Edward Monson, Jun., architect, Grosvenor House, The Vale, Acton :—

J. Rutter, Latimer-road (accepted)	£1,200	0	0

For storm-relief sewers, Eastbourne. Mr. Charles Tomes, Borough Surveyor :—

Bridges & Giles	£24,980	0	0!
Bottoms Bros.	20,000	0	0
Hill Bros.	19,337	0	0
J. B. Marshall	18,705	0	0
Cowdery & Son	18,550	0	0
McKenzie & Williams	16,986	0	0
J. W. Neave	15,500	0	0
Beadle Bros.	14.50	0	0
W. J. Botterill	13,898	0	0
Ford & Everitt	13,890	0	0
Woodham & Son	13,190	0	0
J. Hurst	12,600	0	0
J. Haywood	11,055	0	0!

For the erection of a working men's institute at Castle End, Cambridge. Mr. Henry George Bishop, architect, Cambridge :—

Rye	£688	0	0
Yarrow	650	0	0
Charter L. Williams	648	0	0
Newman (accepted)	590	0	0

[All of Cambridge.]

For erecting villa-residence in Lucien-road, Tooting, for Mr. J. C. Brooks, omitting painter, glazier, and paper-hanger. Mr. S. B. Grosvenor, architect, 23, Southampton-buildings, Holborn. Quantities supplied by Mr. Henry Burton :—

Oldis Bros.	£822	0	0
Anley	770	0	0
Johnson	758	0	0
Burman & Son	697	0	0
W. Smith	697	0	0
W. Groom	677	0	0

For building new school buildings at the Dudley Union Workhouse, Dudley. Mr. J. B. Marsh, architect, Dudley. Quantities by the architect :—

Bennett, Birmingham	£7,947	0	0
Robinson, Birmingham	7,666	0	0
Holland & Son, Dudley	7,620	0	0
Cockin & Son, Old Hill	7,586	13	0
Webb & Round, Dudley	7,497	0	0
Rowbotham, Birmingham	7,230	0	0
Peacock, Gornal	7,100	0	0
Harvey, Netherton, Dudley	7,020	0	0
Garlick, Birmingham	6,999	0	0
Nelson, Dudley	6,949	0	0
Jones & Son, Sedgley	6,890	0	0
Willetts, Old Hill	6,889	11	0
Horton, Brierley Hill	6,746	0	0
Guest, Brettell-lane (accepted)	6,620	15	0

For the erection of cast-iron cisterns and supports, and for various alterations of the water pipes, and adapting them to the new artesian well, at City-road Workhouse, for the Guardians of the Poor of the Holborn Union. Messrs. H. Saxon Snell & Son, architects :—

M. T. Shaw & Co.	£647	15	0
T. Potter & Sons	516	0	0
W. J. Fraser & Co.	612	0	0
J. Richmond & Co.	530	0	0
East Surrey Ironworks	458	15	0
C. Kinnell & Co.	417	10	0
May Bros. (accepted)	480	0	0

For erection of studio and stables at Glasllyn, near Rhayader, for Mr. H. W. B. Davis. Mr. S. W. Williams, architect, Rhayader. Quantities by architect :—

T. P. Evans, Rhayader	£1,600	0	0
G. Dore, Rhayader	1,360	0	0
J. Davies, Hereford	1,160	0	0
H. Welsh, Hereford	1,150	0	0
R. Davies, Newtown	1,122	0	0
J. Williams, Knighton	1,081	0	0
W. Bowers & Co., Hereford *	985	0	0

* Accepted.

For the erection of shop premises and dwelling-house for Mr. John Mackie, in Church-street, Camberwell. Mr. R. P. Whellock, architect, Church-street, Camberwell, and Finsbury-circus. Quantities not supplied :—

W. Smith (3,879l., corrected to)	£5,879	0	0 !
R. Conder	5,741	0	0
H. L. Holloway	5,487	0	0
F. Higgs	5,440	0	0
J. Tyerman	5,371	0	0
W. Downes	5,366	0	0
J. Marsland	5,295	0	0
D. D. & A. Brown	4,990	0	0
A. Mackie (accepted)	2,941	0	0!

For roads and sewers on the Glebe Land Estate, Woodford Green, for Mr. Bradshaw Brown. Mr. J. D. Hooper, surveyor, Woodford :—

J. L. Cattell	£1,331	0	0
H. Philips	1,2 8	0	0
G. Impey	1,183	0	0
L. Knight	1,169	0	0
J. Jackson	1,150	0	0
C. G. Pound	1,130	0	0
T. Knight	1,088	0	0
Rowland Bros.	1,065	0	0
R. Strachan	1,025	0	0
Eli Wilson, Walthamstow (accepted)	998	0	0
W. Nicholls	995	0	0
Woodham & Fry	979	0	0
Jesse Jackson	966	0	0
J. Barwell	944	0	0
T. Adams	898	0	0

For decorator's and painter's work in Wesleyan Chapel and schools, Stainland, near Halifax. Mr. T. L. Patchett, architect, Halifax :—

B. Townsend, Stainland (accepted)	£130	0	0

[Twenty-two contractors competed.]

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

TO CORRESPONDENTS.

T. H. S. (Sydney).—F. J. S. (not required).—E. R.—J. H. A.—H. M. E.—Rev. E. V.—"New Ideas" (we have plenty of our own).—J. G. A. (cannot use the drawing).—H. (send name and address).—J. M. C. (shall have attention).—D. W. & Son (see below).—J. W.—C. M. N. M. (shall appear).—R. P. S.—Z. Y. Z. (take legal advice).—C. & M.—E. L. G. (your reply is childish).—C. S.—F. & Co.—B. B. & Co.—J. B. (you had better ask the architect).—T. S. S. (we can hardly be expected to instruct you in the details of your own business).—W. S.—H. T. & Co. (shall appear).—R. F. R. (under our mark).—G. S. (in last week).—W. T. F. appeared last week).—M. P. B (next week).

Correspondents should address the Editor, and *not* the Publisher, except in cases of busines.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLV. (July to December, 1883) were given as a Supplement with the number of January 12, and A COLOURED TITLE-PAGE was issued the following week, in substitution for that published previously.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING-CASES (Cloth), with strings, to hold a Month's Numbers, price 2s. each; also

THE FORTY-FIFTH VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS,

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, 46, Catherine-street, W.C.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

SUMMER-DRIED
Corsham Down Stone
For Winter Use.
PICTOR & SONS, BOX, WILTS.
[ADVT.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset.—Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [ADVT.

Doulting Freestone,
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
Of best quality, supplied from their own Quarries and Kilns by STAPLE & HANN, Stoke, Ilminster. Agent, Mr. H. MITCHELL, 5, Augustus-road, Hammersmith, London, W. [ADVT

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

Immense quantities of
DRY WAINSCOT,
DRY MAHOGANY,
DRY WALNUT,
in all thicknesses.
B. J. HUDSON & SONS,
Whitfield-st., W., and Great Peter-st., S.W.
London. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT.
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description
36A, BOROUGH ROAD,
DISCOUNT TO BUILDERS. LONDON, S.E.

GOLD AND SILVER MEDALS AT AMSTERDAM EXHIBITION.
ZINC ROOFING.
F. BRABY & CO.,
LONDON, LIVERPOOL, GLASGOW.
VIEILLE MONTAGNE BRAND.
NO SOLDER.
NO EXTERNAL FASTENINGS.
PARTICULARS ON APPLICATION. CHIEF OFFICE: 360, EUSTON ROAD, LONDON.